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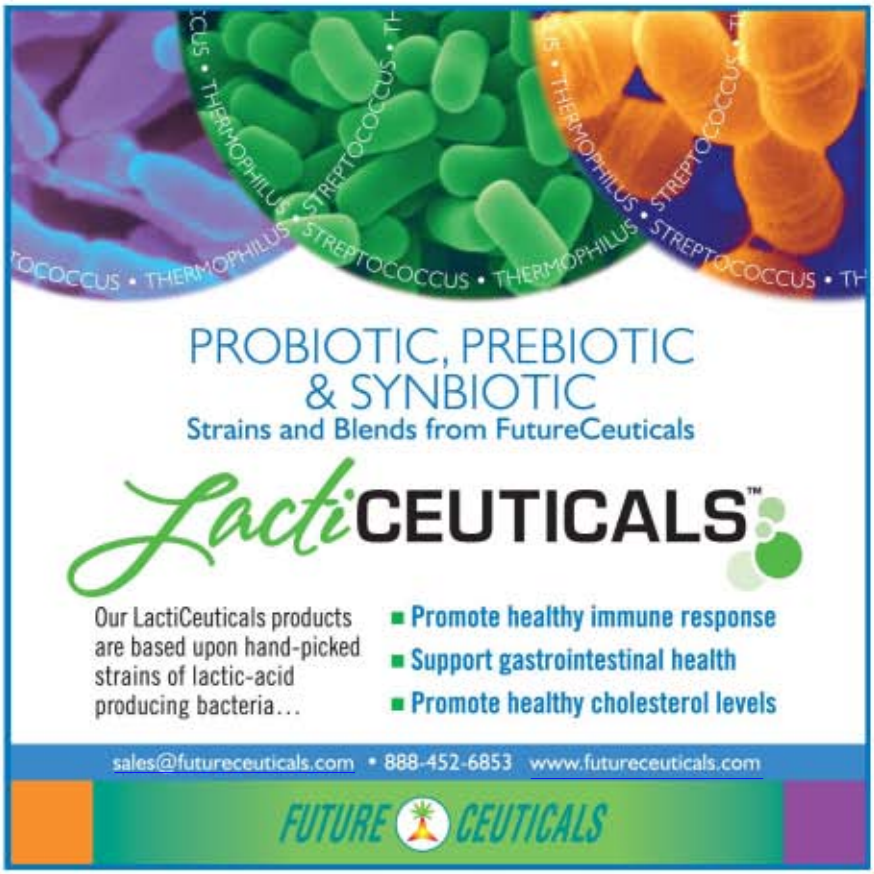

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Unraveling the Mystery of Sweet Perception – October 2007

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I am Jane

Julia M. Gallo-Torres
Managing Editor
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In a typical American family, the mother or wife is charged with most of her family's nutritional needs. The Almond Board of California (ABC) has given this woman a name: Jane. I liked hearing about Jane during a presentation at the group's 2007 Harvest Tour, which took place in California last month. She reflects a lot of my own interests and needs.

Jane is 35 or older, concerned about health, interested in many foods and "on a quest to find better, smarter choices." She is active and focused on her family. The ABC, a group of almond board growers and processors, understands her important role. She "has a profound purchasing power, but also a significant influence on those around her."

Among other foods, almonds have become priority on Jane's list because they are an excellent source of vitamin E and magnesium; have been linked to lowering cholesterol, successfully managing weight and increasing fiber intake; and also are convenient to eat. In a recent ABC survey, 83% of Janes said they consumed almonds on an ongoing basis. Some 54% chose almonds because they "are healthier" than other nuts, while 41% said they taste better than other nuts. In another survey, about 81% of Janes would pay more for a product or menu item that contains almonds; the same percentage also stated they would choose an item with almonds as an indulgence. 88% said they found foods with almonds to be "more interesting," while 73% said almonds appeal to their families.

Restaurants have been paying attention. Foods such as chicken and fish encrusted with almonds have become regular items. Salads get an extra crunch from a handful of almonds. In the supermarket, ice creams, snack mixes, snack bars and chocolate bars (note a huge surge in higher quality dark chocolate bars) are being paired with almonds. According to Mintel, some 61% of new product introductions featuring almonds in 2006 occurred in two categories: confectionery and snacks. If Jane is going to have an indulgent snack, it may as well contain something a little healthy!

Jane is the mother who packs lunches, determines what snacks the kids are going to eat while rushing to soccer practice and figures out what tonight's dinner menu will be. She will have the most influence on her family's eating habits for the rest of their lives. It is a tall order, and she's looking for all of the help she can get. Pf

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The R&D Applications Seminar East provides formulators the opportunity to learn more about ingredient functionality and application challenges.

The R&D Applications Seminar East is an economical event for both suppliers and processors. The added bonus is continuing the dialog started at your educational session at the NY IFT Suppliers Day Expo.

A limited number of educational sessions are available. Make your plans for *Prepared Food*'s R&D Applications Seminar East 2008 now.

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For further information, contact Marge Whalen at 630-694-4347 or whalenm@bnpmedia.com.

Hitting the Shelves

Better Than One

Kellogg's Pop-Tarts Splitz Toaster Pastries line is said to contain "two crazy good flavors in one, split down the middle." The line is available in two varieties—Strawberry & Blueberry and Vanilla & Chocolate. The company has bolstered this line with substantial trade support. At retail, the products are featured with displays and discount support, creating excitement for their unique flavor profiles and encouraging consumers to try them.

With these new products, Kellogg is bringing fun and energy back to the established breakfast brand. Pop-Tarts have been a quick, tasty breakfast alternative for children and adults for many years. Introductions over the last few years have been relatively safe, focusing on new flavors or new characters on package. However, in the last few months, Kellogg has been more adventurous. Between this introduction and April's Pop-Tarts Go-Tarts!, Kellogg is thinking outside the box.

See the Veggies

Functional foods are everywhere. Many manufacturers have fortified their products with functional ingredients to catch consumers' attention, but General Mills has taken a different approach. The company's Green Giant Healthy Vision Vegetable Mix calls out the natural antioxidants lutein and vitamin A, which are found in the carrots and zucchini included in the mix and are said to help support healthy eyesight.

The company also launched the Green Giant Immunity Boost Vegetable Mix with vegetables, reputed to be naturally rich in antioxidants and vitamins A and C to help support a healthy immune system. This natural approach to functional foods may be an effective way to reach consumers and their wallets.

Healthy, Tasty Snacking

Procter & Gamble has positioned its new line of reduced-fat potato crisps as the ultimate combination of smart snacking and gourmet flavor and taste. Pringles Smart Flavors Potato Crisps are available in Zesty Guacamole, Sour Cream & Onion, Original, Savory Cheddar, Tomato Mozzarella and Sweet Mesquite Barbecue flavors. The products contain 30% less fat than regular Pringles, and they are kosher certified and free of trans fat.

Through creative branding and packaging techniques, the company has elevated a traditional line extension into something much more interesting for the consumer.

Taste of Chocolate

Target has tapped into the premium trend in an interesting way, launching a new dark chocolate single-origin tasting kit under its Choxie brand. By positioning the product as a tasting kit, the company leverages the gourmet associations consumers have with wine and cheese tasting. It also conjures the tasting menus offered in fine dining restaurants, where well-known chefs offer customers a set menu of numerous small portions that represent their best dishes. As such, the product targets the aspiring gourmet chocolate connoisseur who sees himself as having a sophisticated and discerning palate.

This positioning is enhanced by the inclusion of five different single-origin chocolates, each containing unblended cocoa from Venezuela, Ghana, Ecuador, Costa Rica and Peru. Single-origin is a term that started in the wine industry, moved into coffee and has now entered the chocolate market. Each different chocolate variety in the Choxie kit also has a high (but distinct) percentage of cocoa—again, appealing to consumers who want to understand the complexities of chocolate.

PHOTO COURTESY OF ISTOCKPHOTO HEIKO BENNEWITZ

Bounty of Benefits

Globally, manufacturers are expanding their lines of products with functional benefits. This trend crosses category and country boundaries, with U.S. manufacturers featuring prominently into new functional product introductions. In the U.S., functional claims grew 33.7% from 2005 to 2006, and launches through August 2007 have already surpassed 2006 totals—perhaps reaching more than 1,000 launches by the end of the year.

Products focusing on digestive health led functional claims in 2006; however, in 2007, weight-control claims have assumed the top position after a decline in 2006. Globally, spoonable yogurt was the top category for functional food launches, while the category is second among U.S. functional launches.

For U.S. baby food manufacturers, look to global functional category launches for perspective. Baby food and formula are among the top 10 categories globally for functional new product launches, but in the U.S., neither category appeared in the top 15 functional food categories. One recent baby food introduction in the Netherlands provides an example of this and the gluten-free trend mentioned last month. Nestlé NAN 1 H.A. Hypoallergene Volledige Zuigelingenvoeding (Hypoallergenic Formulae for Infants) is an instant formula powder which claims the bifidogenic effect that naturally feeds the natural, healthy bacteria found in the bowel, LC-PUFA (long chain polyunsaturated fatty acids) and Opti-Pro HA (DHA and ARA nucleotides). It claims to improve natural immunity and reduce the risk of allergies.

Function Junction

U.S. New Product Introductions by Functional Claims, by Year

Category	Jan.-Aug. 2007	2006	2005	% Change 2005-2006
Digestive	64	53	17	212%
Cardiovascular	52	46	50	-8%
Weight control	105	32	65	-51%
Immunity system	17	17	17	0%
Brain/Nervous system	27	15	16	-6.3%
Bone health	15	13	3	333%
Beauty	6	7	6	17%
Other	62	128	70	83%
Total sample	283	266	199	34%

Source: Mintel GNPD; ranked by 2006 launches

GlobalTrends

Promoted as a new way to help manage weight, sustainable foods that keep consumers full over a longer period have been introduced in Japan in different forms—from drinks to cookies. They are now reaching the West on a larger scale, with major manufacturers offering them as variations of their most widely known brands.

In Ireland, Kellogg has launched Special K Sustain, a breakfast cereal made with protein and fiber and designed to keep the consumer satisfied longer. This product is a medley of crunchy brown rice and whole-wheat flakes with a honey flavor. It has soy clusters and its own special balance of protein and fiber that claim to keep hunger at bay. The cereal is fortified with extra folic acid and is low in fat.

Continuing with the sustainable energy theme, the Innocent Superfoods Natural Slow-Release Energy Smoothie was launched in the U.S. in July. It retails in a 250ml bottle and is available with a blended Guavas, Mangoes and Goji Berries flavor. The product capitalizes on the natural benefits of the ingredients—high fiber from the guava and beta-carotene from the Goji berries—plus low GI for a slow-release energy advantage.

Another low-GI offering is in Australia. The Hopper Hip Hop Sultana and Honey Fruit and Cereal Bar contains 40% real fruit and less than 6% fat but with no preservatives, artificial colors or flavors, added sugar, trans fat or sulfur dioxide. The bars are said to be a tasty, nutritious snack and are a powerful energy source for healthy kids. This is the first product seen in its category to target children.

Gamma-tocopherol is an interesting emerging ingredient found primarily in skin care, vitamins and dietary supplements. Recently, manufacturers have begun to include this next-generation ingredient in functional foods and beverages that primarily focus on weight loss. However, Coca-Cola has taken a unique positioning approach with gamma-tocopherol by noting the overall beauty benefits of the product. Found in Japan, Minute Maid Beautia is a beauty support drink for women who want to be healthy—both internally and externally. It contains gamma-tocopherol (100mg), as well as skin-moisturizing hyaluronic acid and vitamin C. Beautia offers the refreshing taste of acerola and lemon juices.

Launching a New Product?
If so, contact Diana Sheehan at
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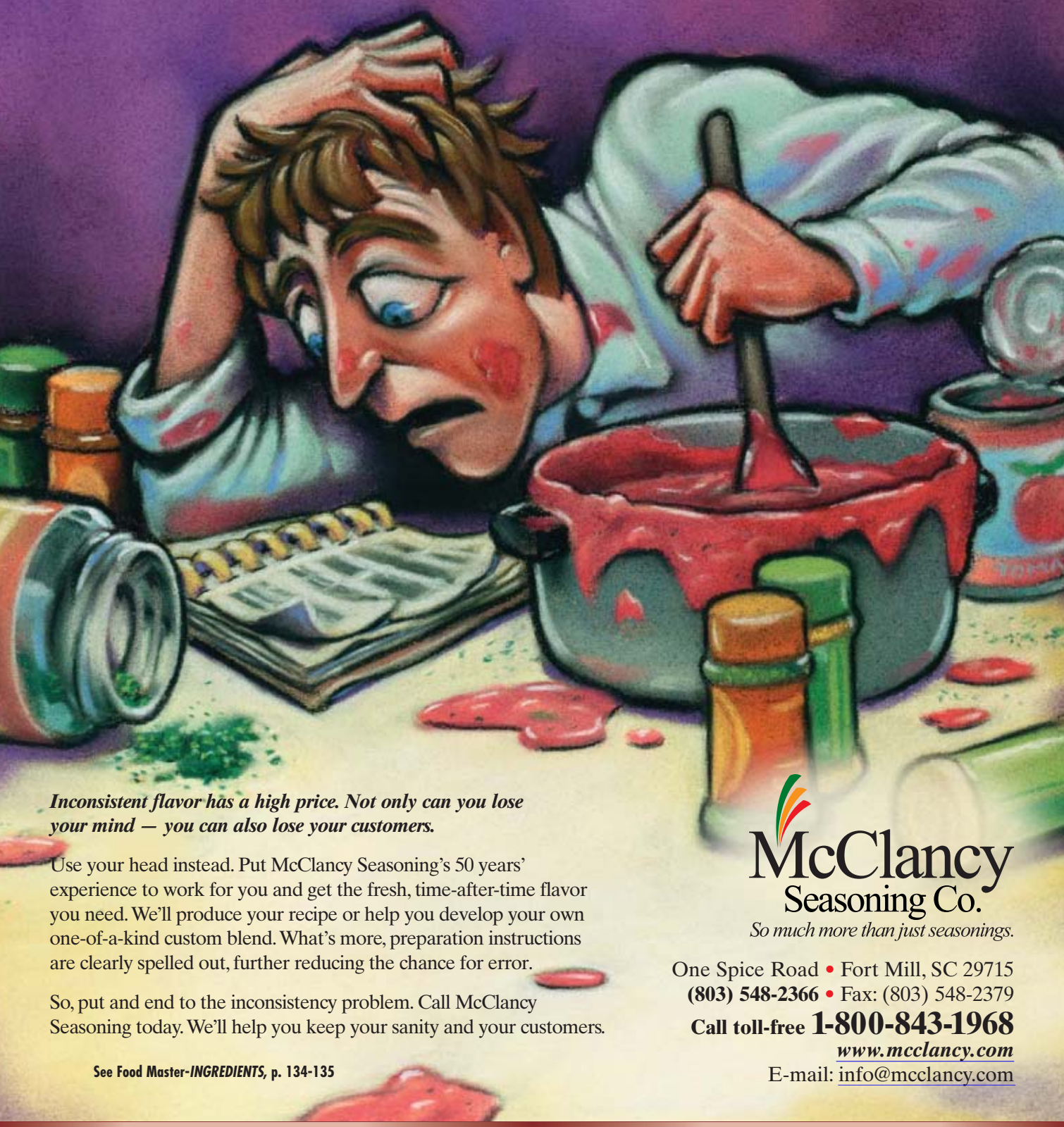

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Helping Hands Deliver Innovation

Nominations for the 2007 Spirit of Innovation Awards grew to the greatest heights yet, in terms of both quantity and quality. The retail winners managed to make a gourmet dessert simple to make, a hot sandwich in less than a minute and a breakfast treat more convenient than ever.

William A. Roberts, Jr., Business Editor

RW Delights had a straightforward goal: an upscale dessert prepared quickly and easily without sacrificing quality or taste. In addition, its Heavenly Soufflé would be all-natural and kosher, taking a product intimidating even to seasoned chefs and making it accessible to any consumer. The end product goes from the freezer to the table in 20 minutes and presented the developers with a variety of challenges. As the company's owner, Wendy Friedmann, recalls, "The main challenge was creating a product where the batter could be frozen into ceramic ramekins and not affect the process of the egg whites expanding when baked, to create the perfect soufflé."

While the company may be small, the innovative nature of the product and the teamwork involved in creating the item display the qualities inherent to the Spirit of Innovation Awards. However, the teamwork involved in the Heavenly Soufflés is somewhat unlike any seen among past winners. Previous recipients largely relied upon in-house departments to overcome the challenges in a product's creation, while others saw vendors offer solutions and, on occasion, the entire concept behind the product. RW Delights would take a completely different route.

The company founders, Friedmannn and Roxanne Kam, are lifelong friends with a love of cooking but no formal background in the industry. "We both had very big careers," Friedmann notes. "Mine was in sales and marketing in technology and publishing. Hers was accounting for large

2007 Spirit of Innovation Awards: Second Place

Stax Time

Breakfast may be the most important meal of the day, but many consumers simply refuse to take the time to eat in the morning, due in large part to other responsibilities occupying their attention. Cathead Foods sought to make breakfast much more convenient with Go Stax.

The line features an individual serving of buttermilk pancakes made with wheat flour and including buttermilk, real butter and pure maple syrup. Key to the creation of the frozen line is the patented combination of items in the butter/syrup patties in each box.

Butter and syrup have been formed into two pats of topping that melt over the pancakes during the one-minute microwave cooking time. Developers Tom and Julie Johnson "wanted alternatives to cold cereal, cardboard 'breakfast' bars or fast foods, yet which still met the need for speed in the mornings, when life is a little hectic," Tom recalls. Another goal was for a "good meal starting the day that actually tasted good and was also nutritious." The pancakes boast 4g of fiber and 4g of protein in each serving, as well as only 0.5g of trans fat. In fact, the developers note they are still tinkering with the formula to remove trans fat completely.

Realizing the value and innovation inherent in that butter-syrup-pancake-packaging combination, Cathead has gone on to patent the entire product. The effort was not without its challenges, the Johnsons recall. "Taste-testing several different formulae for butters, syrups, pancakes and packaging, trials and failures for the melting process led to the product which now achieves a natural maple sweetness." In all, the company performed more than 2,600 taste tests before launch.

Beyond the formulation, the package proved a key component. "It had to be able to withstand microwaving without leaking any of the contents, yet still be strong enough to allow the consumer to eat it right from the box. As Cathead is a small company, developers also sought a hand-erected package, thereby negating the need for an expensive industrial case erector.

Commenting upon the unique nature of the product, Tom explains, "Go Stax are the only single-serve, self-contained, on-the-go breakfast item like it on the market, and…it continues to grow in both the retail and vending arenas." The growth is having quite an impact on the small company; it has led Cathead to plan a packaging revision that will take advantage of automation in assembly.

companies. (The soufflés) started as pretty much a hobby, and this was something that we would serve as dessert to friends. Eventually, we started to freeze it and, ultimately, like so many small businesses, someone suggested we bring it to market."

Friedmann and Kam determined that they had an edge over certain other food company startups. "We hit upon a very good product idea," Friedmann explains. "From a quality standpoint, we did a lot of testing for the right recipe, but we're business people, who happen to have a very good product. So how we look at it is really from a business perspective. Others have had great ideas and started companies, but they were chefs or bakers or food hobbyists who did not have the business experience. So they ran into issues when it came to creating a company and how to take that company to the next level."

Just Ask

That is not to say that the expertise or knowledge of chefs, bakers and food experts is not integral to the product creation. In fact, Friedmann and Kam discovered they needed quite a bit of help throughout the process of product creation. However, unlike major companies, RW Delights does not have departments in different areas to offer solutions.

"As we've gone along," Friedmann relates, "we've met different people. When we were doing our original testing, we had a baker helping us. The small, homegrown recipe has changed significantly. When it came time for the eggs, for instance, the American Egg Board (AEB) was a big help. Rather than hiring anyone in-house, it has been utilizing the expertise of other people and institutions. It has really been understanding that, though we had a great product, our expertise was not in the baking and the production; if we wanted to be able to bring this to market, we needed help."

There began a series of efforts with a number of individuals and companies, as well as a lot of testing and iterations of the Heavenly Soufflés. When they first started a year-and-a-half ago, Friedmann and Kam rented kitchen space from a cooking school, The Artisan Baking Center. They would cook and experiment with their recipes from 6:30 in the evening until 3:00 in the morning. The pair did not want to

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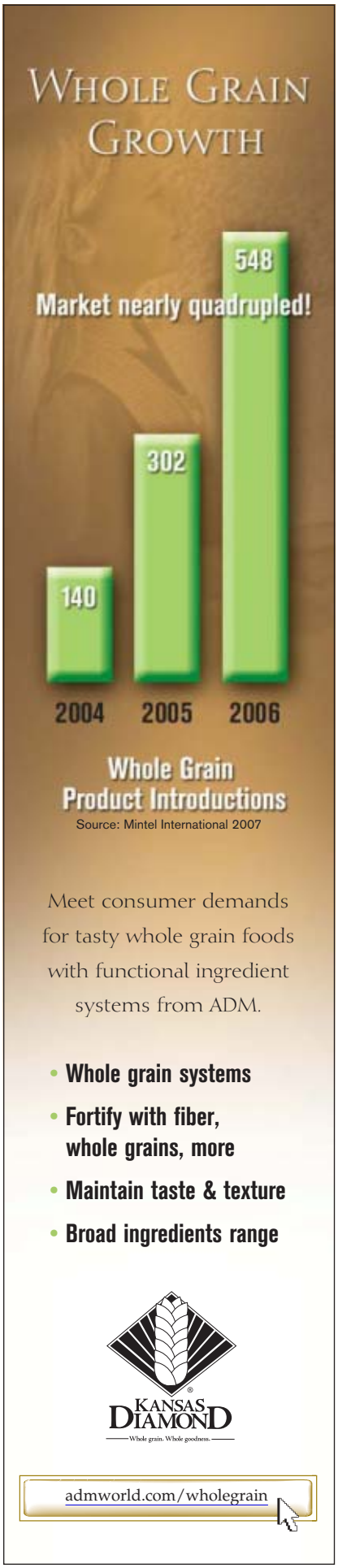

2007 Spirit of Innovation Awards: Third Place Melting Away

Citing a survey finding 70% of Americans work through lunch or spend less than 10 minutes on a quick midday meal, Oscar Mayer launched Deli Creations Hot Sandwich Melts. The product is a "build-your-own" sandwich, complete with Oscar Mayer shaved meats, premium Kraft cheeses, specialty sauces and an innovative sub roll that heats in the microwave in 60 seconds.

Sydney Lindner, associate director of corporate affairs with Oscar Mayer, identified a number of different teams involved in the product. "The departments/functions involved in the product's development were marketing, corporate information systems, R&D product and R&D package. To achieve the ultimate hot and melty sandwich, the team focused on recipe development. This meant endless hours researching ingredient combinations and gathering for bench-top experimentation and tasting sessions."

After 12 months of testing, the teams had finished a successful product, which met with strongly positive consumer research reviews.

invest everything they had in the venture. It was more a process of starting and seeing how the testing went.

Friedmann explains they tested the product "for four months solid and continuously, isolating each variable." While that amount of time might seem quick to major companies, it is a distinct advantage for smaller entities. Yet these smaller companies have their own troubles, like locating and identifying suitable ingredient sources.

No Plain Vanilla

"One of our challenges was vanilla," says Friedmann. "When we first started our product, we used a vanilla that (Kam) had bought while she was traveling in Mexico. We had created a product that we really liked; however, then we could not find this particular brand, and we could not replicate it. We must have gone through 20 different vanillas."

Friedmann notes particular assistance from the Artisan Baking Center. It served both as a resource and put them in touch with others in the industry who could offer help or ideas. Thanks to the group, RW Delights found the baker it would use and different resources around the country—be it suppliers or development assistance—people in the industry who would listen to ideas and offer advice and constructive criticism. They even helped with some sourcing, though the company notes it does most of the sourcing itself.

In addition to the issues of finding just the right vanilla, chocolate likewise proved troublesome. "We tried every chocolate we could think of—all the high-end chocolate—because we were looking not just for that flavor. We knew that when you freeze the product and re-cook it, it has to retain the texture. That chocolate for us was a very big thing."

Friedmann and Kam found that much of their development was simple trial and error. It proved to be a detail-oriented, exacting process, they note. They would take each aspect of the product—everything from the freezing process to the ingredients—and work on each individually, even though they may have had all of the other aspects finalized.

Asked to identify a primary challenge, Friedmann quickly answers, "The eggs. One of the challenges of being a small company—and small bakers—came when trying to multiply the recipe. They do not grow evenly, the ingredients. So if you are using four yolks and eight whites, you can not multiply that by 40 for a larger recipe. There was a lot of trial and error on the egg side of how to get enough air using whites, but not making it too fluffy and not too dense. So, there was a lot of testing. AEB helped us to understand the properties of the eggs and why certain things reacted certain ways. They were very good."

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The assistance provided by AEB is just one resource Friedmann recommends for chefs, food scientists and other individuals seeking to start a business. "We called (AEB) on the phone, and they were there for us. A lot of resources are out there for people. The American Institute of Baking (AIB) has a lot of resources where you can just call and get an expert on the phone. AIB has its website, which is helpful, but you can call. I would phone a person there and tell him my specific issue, and an expert would call me back the same day. They would spend a lot of time on the telephone with me, and they talked to me a number of times."

> "Though we had a great product, our expertise was not in the baking and the production. If we wanted to be able to bring this to market, we needed help."

In one instance, Friedmann had a question about an issue with a distributor and a requirement from Whole Foods Market. A person at AIB spent 40 minutes on the phone with her and explained what Whole Foods wanted and talked her through the process and scenarios that others had been through. "The resources are out there. They are phenomenal, if you know how to find them."

Package Delivery

The package of the product proved an issue early in the development, and the duo selected ceramic ramekins as the delivery vehicle fairly soon in the process. "When we first developed it, we thought the ramekin was integral to the product," Friedmann recollects. "Obviously, cooking in something that is ceramic will conduct heat differently than something in paper or plastic or metal. The ramekins convey a feeling of high-end, what people expect when getting a soufflé."

Friedmann foresees producing refills for the ramekins in the near future, likely during 2008, but distribution is proving a challenge. The refill cannot be in a tube where it can be squeezed. RW Delights makes the batter and puts it directly in the ramekins and freezes it immediately. The more the batter is manipulated, the less air will be in it. Currently, Friedmann and Kam are working to find something to ship the refills and get the product into consumers' hands, where they can get it into the ramekins without having to handle the batter too much.

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They also are developing new flavors for the line. "One we are working on, which we had hoped would be our second flavor, but it has been a challenge, is the lemon soufflé," laments Friedmann. "The problem is, once you introduce any type of citrus in the batter, it is going to separate upon freezing. We have been testing it probably for about a year. We have tried everything from emulsions to oils to actual lemon. How do you get that really tart, tangy fresh lemon flavor and not have it separate? The things that we are using that are not separating have that dull, fake lemon flavor. That is our challenge with the lemon soufflé. I have spoken to dozens of people asking for help." It is that kind of teamwork and innovative spirit, as well as a willingness to recognize that innovation often requires asking for advice and support, that have helped make RW Delights a success. Pf

Website Resources:

www.preparedfoods.com/CDA/HTML/032901cb491e7010VgnVCM100000f932a8c0 — Spirit of Innovation Awards

www.heavenlysouffle.com — RW Delights

www.catheadfoods.com — Cathead Foods

www.kraftfoods.com/om — Oscar Mayer

www.artisanbakingcenter.org — The Artisan Baking Center

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Beverage Boost

Fortified carbonated beverages may not be brand-new to American consumers, but they are still something of a novelty—with the primary introductions coming from PepsiCo and Cola-Cola. Around the world, the idea seems relatively novel, as well, with only a dozen entries appearing in the past year, and the prior year saw only 11 bear a functional claim, according to the Mintel GNPD.

Yafora Ltd. is bringing the notion to a new Schweppes line in Israel. Lightly Sparkling Schweppes will include three flavors (berries, apple-lime and peach) and will be fortified with vitamin B complex. Udi Alroy, vice president of Global Marketing with the supplier of the vitamin B complex, notes the difficulty of working with the carbonated beverage: "It was much more challenging for us to add nutrients to carbonated beverages, which have a different solubility (than juices, milk and other beverages)."

No Change—For the Better

Mars Snackfood U.S. introduced 16 new products at this year's All Candy Expo, but the true news from the company may well have been a change it refuses to make.

Among the new products out now or coming soon are 3 Musketeers Mint, Dove Beautiful (milk chocolate with skin-nourishing vitamins and cocoa flavonols, to be launched in early 2008), Dove Origins (a line of single-origin chocolate products, likewise to debut in early 2008) and Twix Java (featuring coffee-flavored caramel paired with a cookie and covered in chocolate, to be launched in December 2007), as well as a number of other products.

However, Mars' big news came in its announcement supporting the current Standards of Identity for chocolate: that is, chocolate made with 100% cocoa butter. A current industry petition proposes to revise the standards to allow manufacturers to call a product "chocolate" even if it uses vegetable oil as a substitute for cocoa butter.

Nice Pair

The popularity of coffee continues unabated, and tea consumption has been on a steady up-tick of late, as well. In fact, studies suggest tea drinking is growing faster than coffee consumption, as tea sales have quadrupled over the past three years, and 127 million Americans regard tea as their favorite beverage, according to the website SupermarketGuru.com. Now, prepare for what may be a wave of tea accompaniments.

The San Francisco Chocolate Factory has introduced a range of chocolates designed for pairing with green, black and chai teas. Shaped into bite-sized drops, the chocolates have recommended pairings:

- 31% white chocolate for the delicate, nuanced flavor of green teas.
- 38% milk chocolate for the smooth, rich flavor of chai teas.
- 55% dark chocolate for the strong, robust flavor of black teas.

The Tea Lover's Chocolates join the company's Coffee Lover's Chocolates and Wine Lover's Chocolates.

'Light' Banter

Federal health officials meeting in Washington are considering whether to add symbols with nutrition information to food labels, similar to a color-coded "traffic light" system British companies use. The hope is this would help American shoppers make healthier food purchases.

The two-day meeting collected comments from food companies, trade groups and a variety of others, reports the Associated Press. It notes any action is likely "years away."

The British "traffic light" system features green, yellow and red lights to denote whether a food is low, medium or high in fat, salt and sugars. According to the country's Food Standards Agency, green- and yellow-flagged foods have seen sales increase, suggesting a real transformation of consumer behavior. Pf

Savvy Students

Much research has explored the dining preferences of Baby Boomers and the follow-up generations, and all along the way, there has been a discernible trend toward eating in restaurants and even a move toward finer dining. For younger consumers, this has had a notable impact upon their expectations and demands—even regarding their school dining options.

The NPD Group notes that foodservice establishments on college campuses "have their work cut out for them" when meeting the desires of young consumers with sophisticated and discerning tastes. These restaurant-savvy students have high expectations and, while they are satisfied with their overall campus cafeteria experiences, it is not overwhelmingly so. In fact, NPD Group notes, "There is a huge opportunity for on-campus dining services to improve their customer satisfaction."

"Restaurants are really shaping teens' expectations on what should be available to them when they are at school," explains Kyle Olund, NPD Group product manager. "Campus foodservice providers have to cater to their expectations."

At quick-service restaurants, teens' overall satisfaction grew one percentage point from 2002. They are even less satisfied with school and college cafeterias. On-campus options finish well below commercial restaurants in overall satisfaction. Full-service restaurants scored highest. As Olund predicts, "Those are not numbers to ignore. It is going to be even more challenging for campus dining services to obtain levels of satisfaction with their consumer base."

For more information, contact Caryn Portnoy with The NPD Group, caryn_portnoy@npd.com or 516-625-2443.

Please Please Me

% Rating Their Overall Experience as Excellent for Two Years Ending December 2006

	Age 13-17	Age 18-22
Full-service	47%	44%
Quick-service	40%	36%
Secondary school cafeteria	17%	17%
Restaurant inside school	40%	29%

Source: The NPD Group

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■ Glanbia plc acquired Pizzey's Milling, which produces and markets nutritional ingredients predominantly derived from flaxseed.

■ THAIFEX—World of Food Asia 2008 will be held May 21-25, 2008, at IMPACT in Bangkok, Thailand. More information may be found at www.thaitradefair.com.

■ U.S. Soy appointed Larry Nichols as vice president of sales and marketing.

■ By a vote of 42 to 31, the California Assembly made California the first state in the nation to pass statewide legislation requiring fast-food outlets and chain restaurants to provide nutrition information at the point of purchase. If and when signed by the governor, the bill will make California the first state to require chain restaurants and fast-food outlets to provide nutritional information for standard menu items.

■ ADM announced appointments in the company's Commercial and Production group, including: John Guymon as vice president, Refined Oils Operations; Mark Kolkhorst as president of ADM Milling; Kris Lutt as general manager, Specialty Feed Ingredients; Kevin Swanson as general manager, Packaged Oils; and Joe Taets as managing director, European Oilseeds.

■ ORAFTI Active Food Ingredients named Tim Van der Schraelen as marketing & communication manager.

■ Food additives can trigger hyperactivity in children, Britain's Food Standards Agency warned after scientists at Southampton University found certain artificial colors and sodium bezoate preservative had harmful effects on behavior. They were sunset yellow (E110), tartrazine (E102), carmoisine (E122), ponceau 4R (E124), quinoline yellow (E104), allura red (E129) and sodium benzoate (E211). The results are published in the *Lancet* medical journal.

■ Alan Bernon left his post as president of Dean Foods Co.'s dairy group, and Gregg Engles, chairman and chief executive, will take over his responsibilities.

■ The American Frozen Food Institute (AFFI) added Jorge Martinez as vice president of communications, Amanda K. Shapiro as manager of conventions and meetings and Jason S. Bassett as manager of legislative affairs.

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Scientific Health Claims Review

Mark S. Hostetler, Blackwell Sanders LLP

FDA has published its draft Guidance on evidence-based health claims: www.cfsan.fda.gov/~dms/hclmgui5.html. The utility of the Guidance is two-fold: to replace two prior guidance documents and to explain how FDA intends to (re)evaluate scientific evidence supporting qualified health claims and claims of significant scientific agreement (SSA). The Guidance is intended to help producers evaluate the strength of the evidence to support "health" claims; to describe the causal connections among the data; and to assess how the evidence fits within the totality of the evidence describing a substance/disease relationship. Also, "When FDA does (re)evaluate a health claim, it intends to use the scientific evaluation process described in the draft Guidance document."

■ FDA "intends to focus... on (reports of) human intervention and observational studies because only such studies can provide evidence from which scientific conclusions can be drawn..." Have the studies specified and measured the substance that is the subject of the claim? 21 CFR 101.14(a)(2); (b)(2); and (b)(3) for the meaning of "substance." Have the studies appropriately specified and measured the disease or health-related conditions that are the subject of the claim? 21 CFR 101.14(a)(5).

■ The Guidance classifies the various types of studies available: intervention studies: "Randomized controlled trials offer the best assessment of a causal relationship...because they control for known confounders of results;" observational studies, (which) lack cause and effect controls; research synthesis; and animal and in vitro, which cannot be used to draw conclusions between the "substance and disease in humans."

■ The Guidance gives several examples of "surrogate endpoints of disease risk" and opines that "risk biomarkers...have been shown to be valid predictors...and...may be used in place of clinical measurements."

■ Human studies are to be closely examined and evaluated to determine what, if any, conclusions about a substance/disease relationship can be made. Studies from which scientific conclusions cannot be drawn about the substance/disease relationship are at this point eliminated from further review and consideration. The Guidance lists a number of specific questions to be applied against both intervention studies and observational studies. The conclusions from observational studies of dietary intake of whole foods or multiple foods are inherently limited (according to the Guidance) as, "A study based on intake of a specific food or foods provides no information from which scientific conclusions may be drawn for the nutrient itself."

■ The "methodological quality" of the remaining studies (those which have not been eliminated by one of the earlier determiners) is rated as "high, moderate or low." Assessment factors include study design, data collection, statistical analysis, outcome measurements and relevance of the characteristics of the study population to the general public.

■ As an end point, the Guidance describes FDA's intention to evaluate the strength of the totality of the scientific evidence. Factors include: number of studies and study type; methodological quality rating; study outcome and statistical significance; consistency among other studies and relevance to the total body of scientific evidence; and relevance to the U.S. population. (Studies limited to a population sub-group would only support a limited claim of benefit for that group.)

■ The wording of the claim must reflect the scientific support "with specificity and accuracy." For SSA claims, "a strong standard that proved a high level of confidence in the validity of the substance/disease relationship" is required, meaning that the "validity of the relationship is not likely to be reversed by new and evolving evidence." Pf

FDA Issues "Sugar-free" Letters

The FDA has reaffirmed its regulatory position with regard to "sugar-free" claims in two letters: the first, a Warning Letter to a maker of "sugar-free" assortments; and, the second, a guidance document in the form of a "Dear Manufacturer" letter.

In the letters, FDA reminds manufacturers that the claim of "sugar-free" (or similar claims) may not be used on or in connection with food products, unless the food meets the requirements of a "low-calorie" or "reduced-calorie" food or is labeled as a food for special dietary usefulness. If the food does not meet these weight-control criteria, the label must include the disclaimer that the food is "not a low-calorie food" or is "not a reduced-calorie food" or is "not for weight control." The disclaimer must be in proximity to the "sugar-free" claim and be of appropriate type size.

FDA is concerned that consumers associate a "sugar-free" claim with weight control or caloric reduction, and if the food is not reduced or low, this fact must be conspicuously disclosed. The FDA indicates that its prime focus will be on foods which fail to bear the correct disclaimer.

Mark S. Hostetler is an attorney at Blackwell Sanders LLP. He can be reached at mhostetler@blackwellsanders.com.

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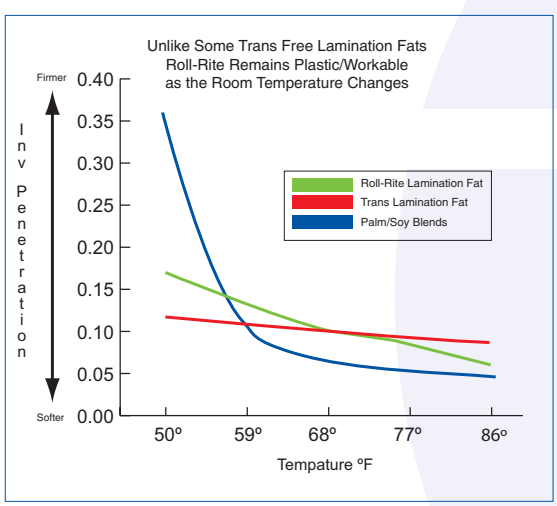

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Great Tastes of America

Elizabeth Mannie, Contributing Editor

"When consumer research data can be provided early enough, formulators have competitive advantage of speed to market, offering products consumers really want," presented Anton Angelich, group vice president–marketing, Virginia Dare.

Virginia Dare conducted a 2007 consumer preferences study on traditional regional American culinary tastes. They believe consumers are more interested in all things local—including food supply, sustainability and culinary preferences. This inspired Virginia Dare to ask the following questions in a "2007 National Consumer Insights Survey:"

- Familiarity and preference for American cuisines.
- Familiarity and degree of concern about various food and nutrition issues.
- Familiarity and interest in beneficial food ingredients.
- Factors important in new food products.
- Overall flavor preferences.

Consumers were chosen from Virginia Dare's database to represent a national profile. They were mailed a survey to be completed in May 2007. Over 300 surveys were returned from 23 states around the country. Respondents' ages ranged from 16 to over 80; 64% were female and 36% were male.

The highest percentage of respondents (40.8%) named Southwestern/Tex-Mex/Mexican as one of their favorite cuisines. BBQ came in closely behind at 37.6%. The top three cuisines respondents "have cooked at home" were BBQ (55% of respondents), Traditional American (55.2%) and Southwestern/Tex-Mex/Mexican (42.9%).

The top two regional cuisines that respondents stated they "would like to try" are French Canadian at 24.5% and Native American/American Indian at 22.9%. Other cuisines ranked closely to each other—down to the more popular that most have already tried.

The top two nutrition concerns that respondents were most concerned with were cancer reduction at 65.2% and food safety at 64.9%. The top two food issues were food freshness at 82.1% and pesticides/herbicides at 63.3%. The nutritional ingredients respondents were least familiar with were acai at 61.4% and polyphenols at 59.2%. The ingredients respondents would like to see added to their foods and beverages more frequently were vitamins (80.3%) and whole grains (74.3%).

Still, ranking of importance of new product attributes showed that the top two were good taste at 96.9% and good nutrition at 88.7%. Less important attributes were trial coupons and similarity to other products. The top two favorite flavors found were chocolate (55.2%) and vanilla (37.9%).

Flavor types relate specifically to regional American cuisines. For example, the top two cuisines respondents wanted to try are French Canadian and Native American. The former is related to maple, blueberry, apple raspberry, cherry, vanilla and chocolate flavors, while the latter brings to mind maple, pecan, caramel and honey. This information provides opportunities for new products that appeal to consumer interest in regional American cooking. pf

For more information:
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Respondents answered questions about regional American cuisines.

Favorite American Cuisines

Type of Cuisine	One of My Favorite Cuisines	Have Cooked at Home	Would Like to Try
1. Cajun/Creole/New Orleans	19.1%	23.2%	11.3%
2. Southwestern/Tex-Mex/Mexican	40.8%	42.9%	5.6%
3. Southern/Home-style	17.2%	28.8%	7.2%
4. Soul food	13.2%	12.9%	18.5%
5. BBQ	37.6%	55.5%	0.9%
6. New England/Yankee	11.3%	20.4%	14.1%
7. Traditional American	31.0%	55.2%	2.2%
8. Pennsylvania Dutch/Amish	7.5%	11.9%	14.4%
9. New York-style	13.2%	20.7%	12.9%
10. Caribbean/Floribbean	19.7%	18.5%	14.7%
11. San Francisco/California-style	9.1%	10.0%	16.9%
12. Puerto Rican	9.1%	11.0%	17.9%
13. Hawaiian/Polynesian	6.3%	9.1%	15.4%
14. Native American/American Indian	1.3%	1.3%	22.9%
15. French Canadian	1.6%	3.4%	24.5%

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Special Section of *Prepared Foods*

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October 2007

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Ingredients such as carbohydrates, proteins, fats, vitamins, minerals and specialty ingredients fuel sports and energy product growth.

Amy Schauwecker Euske, Contributing Editor

Energy products are more likely to be used by sedentary consumers seeking mental stimulation. Sports products are more likely used by consumers engaged in physical activity, or at least wishing for a better lifestyle.

PHOTO COURTESY OF PRNEWSFOTO/SLIPSTREAM SPORTS LLC

The sports and energy product category continues to experience phenomenal growth. Products in this group are about as diverse as the people who consume them. Market research groups define the category as sports drinks, energy drinks, protein powders and liquids, gels, energy bars and athletic bars. However, the consumer and formula profiles for sports and energy products are not the same. Energy products are primarily used by sedentary consumers seeking mentally stimulating ingredients. Sports products are meant for consumers who actively engage in some level of physical activity, although market research reports show that some sports product consumers are not necessarily active in sports; they are just seeking a healthier lifestyle.

Sports food and beverage formulas tend be different for exercise products, depending on whether manufacturers are targeting use before (preparation), during (performance) or after (recovery) the exercise event. "It also depends on whether the product is intended for practice or competition, and if it is for an endurance athlete in a sporting event such as football or resistance training session," says Marie Spano, vice president, International Society of Sports Nutrition spokesperson.

Champion Carbs

"Pre-competition, the biggest goal is simply topping off muscle glycogen stores, preventing hunger and ensuring adequate hydration. Therefore, something light and easy to digest, with little to no fiber, little to no fat and high carbohydrates is key," says Spano. For energy products, the carbohydrate requirements usually are based on acceptable taste and the sweetness levels needed to mask the added stimulants, which are characteristically bitter.

Sports products typically contain 10g to 20g of carbohydrates such as fructose, glucose, sucrose and maltodextrin. Traditional energy products are loaded with sugar, high-fructose corn syrup or lower calorie artificial sweeteners. A wider array of sweetening alternatives now are offered in both sports and energy products for consumers seeking to avoid the rush of blood sugar and insulin.

Isomaltulose, a disaccharide derived from sucrose, is digested slowly and designed to release carbohydrates into the bloodstream gradually for a lower glycemic response. Research has found that oxidation of ingested isomaltulose is significantly less than that of sucrose, most likely due to its lower rate of digestion [1]. Sucromalt syrup, derived by enzymatic conversion of sucrose and maltose,

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PREPARED FOODS

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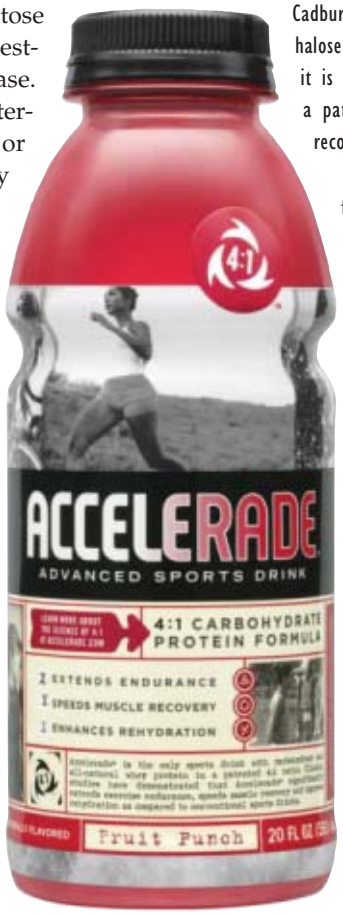
is composed of oligoglucose with fructose and leucrose linkages, and it is slowly digestible, designed for sustained energy release. Erythritol is a lower calorie and natural alternative, derived from fermented grains or sugar. Erythritol is emerging in new energy beverages due to its improved sensory results with other beverage ingredients and significantly higher gastrointestinal tolerance levels than other polyols.

Nutritious breakfast cereals may also soon become the new sports and energy products. Researchers announced at the 54th Annual Meeting of the American College of Sports Medicine (ACSM) that lower blood lactate levels were found in cyclists who consumed whole-wheat cereal with milk, suggesting better glycogen storage linked to the protein and carbohydrate content. Other reports relate consuming lower glycemic index (GI) carbohydrates in breakfasts with greater satiation throughout the day[2].



Cadbury Schweppes' Accelerade Advanced Sports Drink, with sugar, trehalose and whey protein isolate, among other ingredients, notes that it is the first sports drink to contain carbohydrates and protein "in a patented 4:1 ratio." It claims to extend endurance, speed muscle recovery and enhance rehydration.

Reaching the Finish Line

"During competition, the goals are very similar—prevent hunger pangs, keep a ready source of energy available to fuel competition and keep the athlete hydrated. Also, for the endurance athlete or an athlete who is taking part in an all-day tournament playing multiple exhaustive games in a row, it is vital they replace electrolytes—mainly sodium to prevent hyponatremia, a dangerously low blood sodium level which can lead to coma and death. Research also shows that drinking one of the newer sports drinks that contain some protein may help prolong exercise," says Spano.

Many sports performance products contain electrolyte and carbohydrate cocktails, since these ingredients are lost through sweat and urination during intensive exercise. The electrolytes that athletes seek at this point range from mixtures of sodium, potassium, calcium and magnesium. Due to variability in sweat rates and body electrolyte content, individual fluid replacement assessment is recommended by the ACSM.

Energy products primarily are marketed around the stimulant(s) added. They are consumed for the perception they may improve mental performance or enhance calorie-burning—without requiring engagement in vigorous physical activity. Many energy drinks reportedly contain an average of 50mg to 145mg of caffeine per serving. Single or multiple stimulant forms may be added, including pure caffeine, green tea, guarana, ginseng and yerba mate. Energy products, especially beverages, continue to include captivating and exotic ingredients to team up with the stimulants. Taurine, acai extract and d-ribose are among the functional ingredients that might be declared.

Healing Foods

Combinations of proteins, fats, vitamins and minerals have been reported to assist the body's repair from intense exercise and tissue damage. "Post-competition, it is vital for an athlete to replace glycogen stores and rehydrate. Research shows that during the two-hour window post-exercise, providing carbohydrate in a 3:1 or 4:1 ratio (carb: protein) helps promote muscle recovery and growth[3,4]. It is preferable to eat something within 30 minutes and then again within one to one and a half hours. Adding protein

Whey to Train

A recent study reveals that personal trainers who know about whey protein recommend it to their clients. Results from a June 2007 survey of 318 IDEA Health and Fitness Association members were released recently at IFT's annual meeting in Chicago. Dairy Management Inc. (DMI) sponsored the study, which showed that 85% of personal trainers are aware of whey protein. Of that percentage, 68% of them recommend it to their clients, and 59% of those rate it as a high-quality protein.

Whey protein is considered by trainers and fitness-related health professionals to better deliver benefits than soy, meat/poultry, beans, eggs, wheat gluten or peanuts, according to the survey. It reportedly helps burn more fat while retaining muscle than the above-mentioned proteins. Moreover, whey protein is considered by these professionals to better increase lean muscle and enhance physical performance when compared to soy, beans, casein, egg, wheat gluten or peanuts.

Further research determined that consumers prefer whey protein meal replacement bars and beverages than those made with soy or a combination of whey and soy. Findings published in the *Journal of Food Science* (online early articles) reveal that in prototype beverages, whey protein contributed to sweet flavors often preferred by consumers. Prototype bars made with whey protein had a sweet aroma and vanillin flavor, while the texture was characterized by adhesiveness and cohesiveness.

—Barbara T. Nessinger, Associate Editor

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See Food Master-*INGREDIENTS*, p. 148

Research in elderly patients indicated moderate exercise and vitamin D supplementation improved gait speed and body sway, and training improved muscle strength. Vitamin D-fortified milk may offer other benefits to the younger crowd as well.

PHOTO COURTESY OF CALIFORNIA MILK PROCESSOR BOARD

here seems to help decrease markers of inflammation that are reflective of muscle damage," explains Spano[5,6,7].

L-carnitine is responsible for fatty acid transport to the mitochondria to convert energy from fatty acids. Carnitine supplementation is best retained when ingested with simple carbohydrates[8]. Researchers have reported that both one and two gram doses of L-carnitine reduced markers of oxidative stress that leads to muscle damage after exercise, as well as improved recovery[9].

Vitamin C is an important antioxidant in the diet. Many sports product consumers also associate vitamin C with repairing connective tissue damage from intensive exercise. Research indicated that vitamin C supplementation improved recovery from exercise by assisting muscle soreness, muscle function and plasma concentrations of malondialdehyde[10].

Omega-3 fatty acids (especially EPA and DHA) are well-known for their association with reduced risk of cardiovascular disease by lowering triglyceride levels and cholesterol. The FDA permits a qualified health claim surrounding coronary heart disease, giving additional credibility to the ingredients. Omega-3s also reportedly improve recovery time by inhibiting the inflammation that slows down a body's repair efforts around injury[11].

Mixed results are reported on the benefits from vitamin and mineral additions to sports and energy products. Moderate levels of magnesium and zinc were shown to improve strength and muscle metabolism. However, it is unclear whether these observations relate to impaired nutritional status[12]. Other reports show that the use of vitamin and mineral supplements does not improve measures of performance in people consuming adequate levels in their regular diets[13]. Adding excessive levels of vitamins and minerals to products could be degenerative. Research shows that too much zinc actually lowers HDL cholesterol and suppresses the immune system[14].

Makers of sports and energy bars are looking to decrease sugar content and increase the use of ingredients such as isomaltulose, a disaccharide derived from sucrose that digests slowly and produces a lower glycemic response.

PHOTO COURTESY OF DAIRY MANAGEMENT INC.

Performance Powerhouse

"Pre-exercise is similar to pre-competition with one main difference. If a person is engaging in resistance training, or something that requires quite a bit of muscular strength such as rock climbing, they would benefit from taking essential amino acids (EAAs) approximately 30 minutes beforehand," explains Spano. Essential amino acids include isoleucine, leucine, lysine, threonine, tryptophan, methionine, histidine, valine and phenylalanine.

"Research at the University of Texas Medical Branch, Galveston, has shown that EAAs are vital for increasing muscle protein synthesis (MPS) or muscle growth[15,16]. When compared to their studies on whey protein taken pre-exercise, EAAs increased blood arterial amino acid concentrations by 100%, whereas whey only yielded an approximate 30% increase. Non-essential amino acids play no role in MPS," explains Spano[17].

Branched chain amino acid (BCAA) supplements provide the amino acids leucine, isoleucine and valine. Some athletes reportedly experienced increased mental clarity during exercise after consuming these ingredients. Performance under extreme conditions, such as high altitude or heat, may also be improved with BCAAs[18].

Whey protein is a source of BCAAs. Whey protein is primarily a mixture of beta-lactoglobulin and alpha-lactalbumin. Research on whey protein found that it plays a role in accelerating muscle mass development and strength[19,20]. (For more information on whey, refer to the *Prepared Foods* July 2007 issue. Also, see

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Since electrolytes and carbohydrates are lost through sweat and urination during intense exercise, many sports performance products contain cocktails of these two ingredients. PHOTO COURTESY OF PRNEWSFOTO/WORLD LEARNING, DIANE BONDAREFF

sidebar "Whey to Train" for current research on whey protein and sports nutrition.)

Creatine, found in animal proteins, is used in muscle tissue for the production of phosphocreatine, which is associated with the formation of adenosine triphosphate (ATP), or energy. Creatine is used by bodybuilders, and studies support that it helps increase muscle mass, as opposed to muscle endurance[21].

Beta alanine acts as a buffer to counteract acid production in the muscle tissue and may be related to improved recovery time[22]. "It should be taken for at least six weeks and will increase muscle carnosine levels, which current research indicates may help prolong exercise bouts and/or help an athlete maintain their intensity levels longer," says Spano.

"Vitamin D seems to be the vitamin of choice lately due to heightened media attention," says Spano. Research in elderly patients with moderate exercise indicated that vitamin D supplementation improved gait speed and body sway, and training improved muscle strength[23].

Most sports and energy products are categorized as dietary supplements, and the ingredients still have limited clinical studies or GRAS status to support their efficacy for wide-range use. In addition, dietary supplements are now regulated more stringently by the FDA. "Personally, I think

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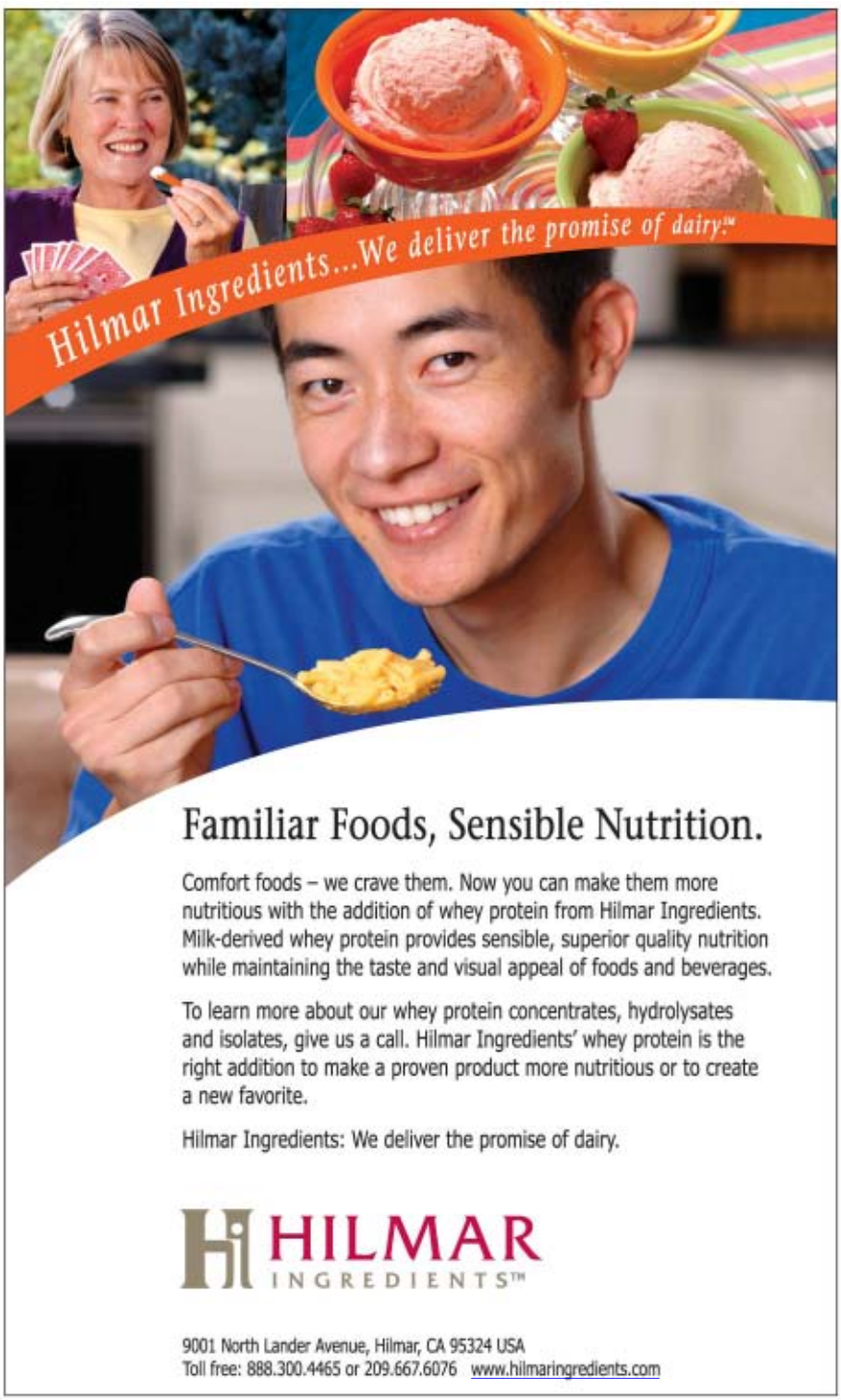
this is great, as those with adulterated, misbranded ingredients will face tighter regulation," says Spano.

Yet to Come

While consumers seek products to keep them going and going, whatever their sport or lifestyle, ingredient manufacturers and formulators try to stay a step ahead in their own race. Energy products continue to pack in greater quantities of stimulants, in addition to other functional ingredients. For the sports product industry, "The bar market is beyond saturated, and any new introduction should be highly innovative. Consumer demand for more healthy products is growing tremendously. People are turning over their favorite bar, looking at the label and putting it back on the shelf when they see partially hydrogenated oil in it or high fructose corn syrup as the very first ingredient and several other types of sugar to follow," says Spano.

"The energy drink business, though still profitable, is getting to the point where companies need something significantly different vs. the 'copy cat' beverages that are out there with a similar container, similar design and similar ingredients. There is no clear leader now, and products that do well and continue to grow in consumer demand should taste good and be innovative and different…Plus, they should be science-based," suggests Spano. Solid and inventive science enables development of new ingredients and discovery of new properties and applications for the old. Consumers benefit with products that promote health, wellness and performance, as the industry competes to see who will meet their needs. NS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- www.acsm-msse.org/pt/pt-core/template-journal/msse/media/0207.pdf — The ACSM's position on fluid replacement for athletes
- www.cfsan.fda.gov/~dms/supplmnt.html — FDA's web page on dietary supplements
- www.supplementinfo.org/HN_VitaminsAZ.asp — The Dietary Supplement Information Bureau's guide to supplements
- www.cfsan.fda.gov/~rdb/opa-gras.html — FDA's "Numerical Listing of GRAS Notices"
- www.ncbi.nlm.nih.gov/sites/entrez — Type in the word "supplements" in the search field for many articles on the subject

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The "Spark of Life"

Kerry Hughes, R&D Applications Editor

Enzymes have been called the "spark of life" because they make life possible due to their function in the human body. Enzymes are proteins that are needed to catalyze (accelerate) biochemical reactions in the body; in fact, all biological processes in the cell need enzymes for the reactions to occur in a significant way. The potential for enzyme use has not escaped scientists' imaginations, as now enzymes are used in numerous industrial and medical applications.

As American Laboratories Inc. has been manufacturing enzymes for commercial applications for 40 years, the company identified a need for a good wide-spectrum enzyme product that could not only fulfill certain industry uses, but also nutritional uses. Panc-Zyme®, a unique animal-sourced enzyme formulation, is composed of protease, amylase and lipase, as well as trypsin and chymotrypsin enzymes at very high potency. As all the raw materials used to formulate Panc-Zyme fit USDA and FDA status as food, they are safe for food use. In the food and nutritional industries, this enzyme complex can also be used for processing foods and/or food ingredients, depending on the manufacturers' needs. Specifically, it is suited for applications in which lower molecular weight proteins are desired. For instance, in dairy and cheese processing, Panc-Zyme can be used to hydrolyze some of the protein components of a formulation, resulting in a change in texture and certain palatability characteristics.

Panc-Zyme has other exciting potential uses. It can be a nutritional digestive aid, used as a dietary supplement or even used in some foods. With Americans gobbling up antacids like bubble gum, the emerging field of nutritional enzyme therapy could find a huge market for helping digestive distress as an alternative to antacids. In fact, 81 million people in the U.S. now suffer from chronic digestive health issues every year (according to the American Gastroenterological Association).

Panc-Zyme cannot be used in baked foods or foods with high moisture as a nutritional aid, as the enzyme would be used up on the food formulation itself. Rather, Bret Wyant, sales representative for American Laboratories, recommends that it be formulated into capsules, tablets or in dry powder blends. Because it contains protease, trypsin and chymotrypsin, it digests protein. Amylase digests carbohydrate, and lipase digests fats, thus making Panc-Zyme a good, general digestive aid, according to Wyant.

Why would we need to supplement with enzymes? "As people age, the enzymes produced in the human body decrease, and the body gets less efficient at utilizing food and metabolizing the nutrients they need to stay healthy," explains Wyant. "There are other enzymes on the market, but most that are marketed for digestion, such as papain and bromelain (which are specific for digesting proteins), do not work well as broad digestive aids."NS

For more information:
American Laboratories Inc. • Omaha, Neb.
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Enzymes may be more general in nature or be very specific for digesting or cleaving certain types of chemical bonds. Mixtures of enzymes can give broader digestive activity than single enzymes alone.

Activities of Selected Food and Nutritional Enzymes

Enzyme	Description of Activity
Protease	Hydrolyzes protein bonds; hydrolyzes peptide bonds that link amino acids together in a polypeptide chain.
Amylase	Hydrolyzes carbohydrate bonds; hydrolyzes starch into glucose.
Lipase	Hydrolyzes lipid bonds; hydrolyzes ester bonds in water-insoluble, lipid substrates.
Trypsin	Hydrolyzes protein bonds; it has specificity towards cleaving amide and ester bonds of arginine and lysine.
Chymotrypsin	Hydrolyzes protein bonds; it cleaves peptides at the carboxyl side of tyrosine, tryptophan and phenylalanine amino acids, as well as other amide bonds (esp. those with leucine-donated carboxyls).
Papain	Derived from papaya latex; it has broad specificity protein hydrolysis.
Bromelain	Derived from pineapple stems; it has broad specificity protein hydrolysis.
Invertase	Derived from *Saccharomyces*; it catalyzes the inversion of sucrose to glucose and fructose.
Pectinase	Derived from *Aspergillus oryzae*; it hydrolyses fruit pectin.

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Condition-specific Blends

Ginny Bank, Contributing Editor

Many consumers today skip the supplement aisles when searching for products that claim to prevent specific ailments; often, they find what they need throughout the rest of the supermarket. Condition-specific supplements (products marketed for specific benefits such as weight loss, joint health and other age-related conditions) are the fastest-growing segment in the nutritional supplement market. However, functional foods geared towards a specific therapeutic benefit are growing at an even a faster rate.

According to an article by the International Union of Food Science & Technology (IUFoST), the overall number of new functional food products with condition-specific benefits was up 87% worldwide between 2004 and 2006. Leading the growth in North America were new cardiovascular health products, followed by products focused on improving digestive health. The report also emphasizes that the term "condition-specific" does not necessarily include serious disease prevention. The focus is on "soft" health claims such as stress management, cognitive and mood improvement, and anti-aging products emphasizing the "inside-out" beauty concept. Such products empower consumers, led by the aging Baby Boomer market, to take control of their health.

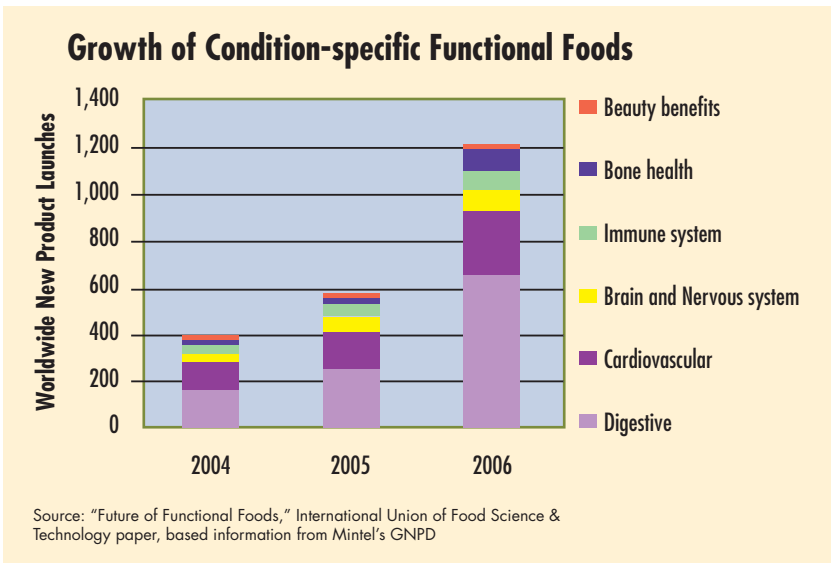
Making a food product "condition-specific" requires a complex knowledge of vitamins, minerals, amino acids, omega-3s and herbal extracts, coupled with an understanding of how these ingredients work together to improve a particular condition. Unlike simply blending the ingredients and putting them into a capsule or tablet, using food as an alternative delivery system means it is critical to understand how these ingredients will interact in various food matrices.

Seltzer Nutritional Technologies has recognized the need for customizable ingredient premixes by launching a line of condition-specific nutritional blends. "What makes these blends distinctive is that their formulas are not set in stone," says Holly Petty, Ph.D., senior product innovation scientist at Seltzer. "Our customized premixes are tailored specifically for each client, and we work closely with the customer to meet their particular requirements."

Seltzer currently offers a variety of condition-specific premix "templates" containing a comprehensive blend of ingredients for a particular condition. For example, the cardiovascular health premix template includes a blend of heart-healthy vitamins and minerals, plus beta-sitosterol, omega-3s and quercetin. The bone/joint health blend contains omega-3s, chondroitin, glucosamine and green tea, in addition to vitamins and minerals. Seltzer also has premix templates for both male and female health, anti-aging, exercise performance, eye health, immune health, digestive health and beauty. NS

> When using food as a delivery system, food developers must understand completely how ingredients such as vitamins, minerals, herbal extracts, omega-3s, etc. will interact in a variety of food matrices.

For more information:
Seltzer Nutritional Technologies Inc. • Carlsbad, Calif.
Holly Petty • 760-438-0089
info@seltzernutritionaltech.com
www.seltzernutritionaltech.com



Source: "Future of Functional Foods," International Union of Food Science & Technology paper, based information from Mintel's GNPD

Condition-specific functional food products have been growing quickly in the past couple of years, with digestive health being the most common condition focus.

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A Taste of Thai Cuisine

Thai cuisine has a local color unlike any other. The cuisine features ingredients such as lemongrass, ginger, garlic, fish sauce, cilantro, pork, cellophane noodles and other components that contribute to its unique identity.

Wilbert Jones, Contributing Editor

Women unload spices for sale at a floating market in Bangkok. Such "street food" markets can be found in most Thai cities and towns.

The foods of Thailand are made of exotic ingredients that are prepared easily and quickly. Food stalls (or street food) can be found throughout Thailand's large cities and small towns. Local vendors advertise their specialty foods by drawing attention to their stalls. They do everything from banging eating utensils on pots to shouting the exotic names of the ingredients used to make their dishes. Some vendors even cook strong-aroma ingredients in their sauces and grilled meats to draw attention.

Eating street food is a way of life in Thailand and many other Asian countries. It is not uncommon to find a typical Thai food stall filled with an assortment of snacks such as coconut chips (thinly sliced coconut pieces, baked and sprinkled with salt); chicken satay (boneless, skinless grilled pieces of chicken breast, marinated in garlic cloves, ginger, Thai fish sauce, soy sauces and honey); Thai spring rolls (deep fried spring rolls made of sliced mushrooms, cooked noodles, garlic, cooked ground pork, fish sauce, grated carrots, bamboo shoots, bean sprouts, green onions, cilantro and black pepper); and cellophane noodle soup (shiitake mushrooms, lily buds, sliced cucumbers, garlic, white cabbage, cellophane noodles, soy sauce, palm sugar and tofu).

Taking Traditional to Mainstream

Sonny Lim, president of Kitchy Koo Gourmet, recently developed a peanut sauce and an orange mandarin sauce with the intention of taking them to mainstream markets throughout America. Lim said, "Some consumers don't want to always use the same old red and yellow condiments for their hamburgers, hot dogs and French fries. Remarkably, both of our sauces cater to many demographics; they are not limited to one simple ethnic group. Chefs love serving our peanut sauce with fried chicken, and it has become very popular with adults and children. They use our peanut sauce as an alternative condiment for French fries and burgers."

Kitchy Koo Gourmet takes the time and effort to show their new distributors and brokers how to develop easy, mainstream recipes using their sauces. Recently, a grilled orange mandarin salmon entrée was introduced to the media at a press reception and received rave reviews. Both the peanut and orange mandarin sauces are also great pairings for traditional Thai foods such as spring rolls, Asian salads, kebabs and some noodle dishes. "We want to put our sauces in the mainstream markets across America. Years ago, other companies took salsa and honey mustard to the grocery stores across the nation. So, I think we have a great chance with our peanut and orange mandarin sauces," says Lim.

Royal Thai Cuisine

One of the most successful Thai restaurant chains in the world is called The Blue Elephant. Husband and wife

culinary creations

These colorful and aromatic dishes help attract diners to the exotic sights and smells to be experienced when eating Thai cuisine.

team Karl and Khun Nooror Steppe opened their first Blue Elephant restaurant in Brussels 26 years ago. Now, there are 11 other locations in large international cities such as Paris, London, Bangkok, Moscow and Dubai. The Blue Elephant restaurant chain is known for its authentic Thai taste. A large proportion of the ingredients used to make the restaurants' signature dishes are flown weekly from Bangkok, so they are fresh. Most recipes used to make the signature dishes on the menus are centuries old. There are a few creative new ones, but they basically show unique variations of traditional cooking techniques.

The Blue Elephant restaurants also offer freshly prepared, ready-cooked Thai meals at take-away counters inside the restaurant. They call this concept "Kitchen Fresh," and it has reached some of the world's largest upscale gourmet stores. Galleries Lafayette, Bon Marché, Galerie Gourmande and Rob carry a complete line of meals—Chicken Satay (marinated, grilled chicken served with cucumber and peanut sauce); Chuchi Prawns (king prawns served with a dash of red curry); Lamb Massaman (a typical dish from southern Thailand–slowly braised lamb in a medium-spicy curry sauce); Roasted Duck (roasted duck served in spiced coconut milk with grapes and pineapples); and Fried Rice Blue Elephant (stir-fried jasmine rice with crabmeat, shrimp, eggs and vegetables).

The Blue Elephant operates a cooking school in Bangkok. Located inside a century-old mansion, students begin learning how to prepare traditional Thai recipes by shopping for ingredients with their cooking instructor at the local markets. The school is not just for tourists; their full classes include chefs, cookbook authors and food product developers.

One of the most acclaimed Thai restaurants in America is Arun's Thai Restaurant, located in Chicago. It has a five-star rating from AAA Motor Club and is recognized by the *New York Times* as "America's best Thai restaurant." Owner Arun Sampanthavivat was born and raised in the southern province of Thailand but has lived in America for over 25 years. He is responsible for all of the restaurant's recipe creations and menu development.

In 1998, Arun made a bold change by abandoning the typical á la carte menu that is so popular in America and created a 12-course, *prix fixé* tasting menu. This approach allowed him to display creativity and skill in balancing flavors, rendering texture and showcasing artful forms of Thai cuisine. "Our customers recognize that $85 per person is a bargain for a custom-designed, 12-course menu of dishes that requires such forethought and precision to execute," he says.

Canadian company President's Choice has introduced a product line of Thai frozen gourmet entrées. Two popular items are Thai Mango Chicken (cooked jasmine rice, seasoned chicken fillets, red bell peppers, diced mangos, garlic, lime juice, seasoning and spices) and Pad Thai (cooked rice

Many Thai restaurants feature curries, such as this *massaman* lamb, which is a typical dish from southern Thailand. The lamb is braised slowly in a medium-spicy curry sauce.

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noodles, tofu, onions, eggs, bean sprouts, carrots, red bell peppers, sugar snap peas, tomato paste, peanuts, tamarind, green onions, lime juice and spices).

Importfood.com is a popular website started in Seattle by Jerry and Yaowalak Good. "We specialize in authentic Thai ingredients and products—everything from sauces and condiments to Thai cookware," says Jerry. There is also a line of fresh Thai produce kits available for cooking as part of a meal; they include lemongrass, Thai chilies, galangal (a member of the ginger family) and limes. Fresh Thai basil, green papaya, whole fresh tamarind, Thai eggplants and shallots are also available. The kits are carefully packaged and shipped quickly to ensure freshness. The company also offers a Thai iced tea product, which has become very popular, thanks to similar iced tea beverages sold in many Thai restaurants across America. The brand sold on the website is called Porkwan, which comes in a 16oz package and is made from Thai tea leaves and spices.

What Next?

The Cheesecake Factory chain will open a new Southeast Asian concept in Los Angeles this year. It will be an upscale, casual restaurant with foods from Thailand, Vietnam, East India, Malaysia and Indonesia. This restaurant concept will join the company's two other ventures, the 124-unit Cheesecake Factory and the 9-unit Grand Lux Café. PF

Website Resources:

www.kitchykoogourmet.com — The peanut sauce and orange mandarin sauce can be ordered here; some recipes are provided

www.blueelephant.com — Website of the famous Blue Elephant Thai restaurants

www.presidentschoice.ca — Thai frozen foods

Wilbert Jones is the president of Healthy Concepts, a food and beverage company that provides menu, recipe and product development consulting services. He has authored four cookbooks, most recently Smothered Southern Foods. *He attended Paris' École de Gastronomique Française Ritz-Escoffier and was a food scientist for Kraft General Foods. For more information, call 312-335-0031 or e-mail: wjhealthyconcept@aol.com. Photo courtesy of Antoinette Fields.*

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On the National Menu

Maria Caranfa, Mintel

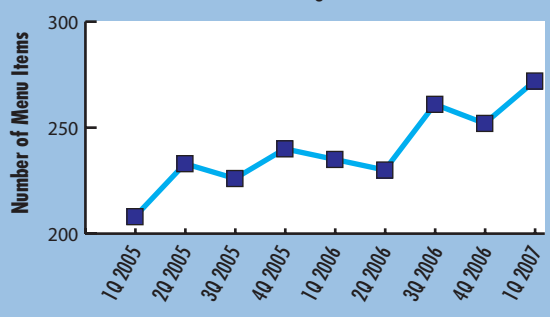
A is for Arugula

Arugula is sprouting all over the restaurant menu. According to Mintel Menu Insights, arugula grew by 31% over the past two years. Arugula varieties of baby arugula, micro arugula, wild arugula—along with locally grown Millarckee Farm Arugula and Old Athens Farm Arugula—can be found on menus. Arugula is found "peppering" mostly fine dining restaurants, but other dining types are picking up on its appeal. Quick-service restaurant zpizza creates its Arugula salad with baby arugula, roasted candied walnuts, shredded parmesan, caramelized onions and cucumbers with its house balsamic dressing. It is also available with grilled chicken breast and avocado.

The mild, peppery flavor of arugula is an exciting addition to salads, sandwiches, pizza and risotto. However, arugula applications in sandwiches are picking up steam. Corner Bakery uses arugula in its Chicken Pesto sandwich—its most popular sandwich—with tender sliced chicken, fresh arugula and plum tomato slices with a sweet and spicy house vinaigrette on a traditional baguette with pesto mayonnaise. Dave and Buster's serves an upscale grilled cheese sandwich called the Havarti Cheese & Pesto Panini made with Havarti cheese, basil pesto, tomato and arugula.

The "A" Game

Incidence of Arugula over Time



Source: Mintel Menu Insights

Free-from

Gluten-free, lactose-free, pesticide-free…these claims are traditionally found on grocery store shelves, but restaurants are adding ingredients, menu items and menus with these and other "free-from" claims. According to Mintel Menu Insights, "free-from" claims are increasingly present on the menu.

Free World

Number of Menu Items Bearing a Gluten-free Claim

Restaurant	Number of Menu Items
Legal Sea Foods	61
Outback Steakhouse	49
Ryan's Grill	48
Bonefish Grill	21
Carrabba's Italian Grill	19
P.F. Chang's	15
Candle Cafe	5
Pei Wei Asian Diner	5

Source: Mintel Menu Insights

The most popular "free-from" claim on menus, gluten-free items primarily help to reduce the symptoms of celiac disease (CD). Gluten is the common name for the offending proteins in specific cereal grains that are harmful to persons with CD. These proteins are found in all forms of wheat (including durum, semolina, spelt, kamut, einkorn and faro) and related grains (rye, barley and triticale), and they must be eliminated from the diet of persons diagnosed with CD.

Restaurants have acknowledged that thousands of people are living with CD and are offering gluten-free menu items. Legal Sea Foods, Outback Steakhouse and P.F. Chang's China Bistro are just a few examples. Furthermore, these gluten-free menu items are not flavor-free. P.F. Chang's created Shrimp with Lobster Sauce made with garlic white wine sauce with Chinese black beans, mushrooms, scallions and egg. Outback Steakhouse gives its customers tips to avoid the gluten in menu items. Outback suggests to "order veggies without seasonings or substitute with potato" as a side dish for its Chicken on the Barbie with gluten-free BBQ sauce.

Burger Bites

The burger is constantly evolving. It has been doubled, tripled and topped with a wide array of ingredients—from chili to pineapple. Who would have thought the next big trend in burgers would be to make them small? Mini burgers can be found on menus across dining types. According to Mintel Menu Insights, menu mentions of mini burgers have increased by 54% over the past two years. Between the last quarter of 2006 and the first of 2007 alone, 14 new mini burger menu items were added to restaurant menus.

These burger bites are not small on taste, often featuring ultra-indulgent beef such as Kobe, Black Angus and B3R-program beef. T'afia serves three mini B3R ranch burgers with BBQ mayonnaise. Ruby's Diner created American Kobe Sliders with its premium Kobe beef, topped with its own Ruby Sauce and golden caramelized onions. Baltimore's Red Maple dispensed with the beef altogether and created Lamb Mini Burgers with pickled red onion, ancho aioli on a spiced pita. In retail, the mini-burger concept has yet to make many in-roads, according to the Mintel Global New Products Database. In May of last year, Kraft added a Mini Burgers Meal to its Lunchables line under the Oscar Mayer banner. It features two grilled burgers made from 100% beef with Kraft American cheese and Wonder buns. While there have been retail introductions in other countries, the Oscar Mayer product is the most recent to hit U.S. store shelves.

Swimming Upstream

Salmon has historically been a major ingredient on the restaurant menu. Unlike some seafood trends, this one continues to swim upstream. Between 2005 and the first quarter of 2007, salmon species (such as Atlantic, King, wild, Norwegian, Scottish, North Atlantic, Nova Scotia and Wild Alaskan Sockeye) have increased by 26%. It has now become the "must have" fish on the menu, found on 74% of casual dining menus tracked by Mintel Menu Insights.

Because of salmon's mild flavor, restaurants can continue to "re-create" the fish in the latest flavor trends. Max & Erma's serves Tropical Salmon made of a grilled Atlantic salmon fillet marinated in sesame and soy, with sweet-and-sour glaze, nested over herb rice and fresh steamed vegetables. Mesa Grill created Ancho Chile-Honey Glazed Salmon with a spicy black bean sauce and "roasted jalapeño crema."

Salmon is also being reinvented because of its high omega-3 fatty acid content. It is probably the best known source of omega-3 fatty acids, and Cheebo is not afraid to say so on its menu. Its Cedar Plank Wild Salmon is described as "rich in omega-3s." Pf

For more information, visit www.menuinsights.com or contact Mintel International at 312-932-0600. Mintel Menu Insights tracks menu trends and innovations from the 350 largest chain restaurants and 150 independent restaurants, also featuring the nation's top 50 chefs.

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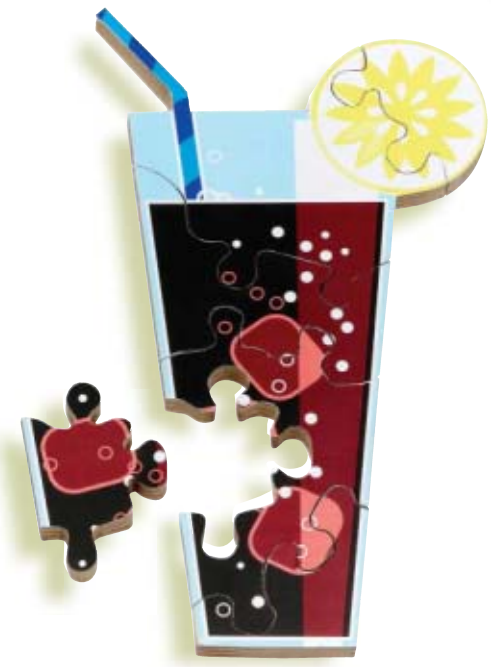

Aspartame is made of amino acids, nature's building blocks of life. During digestion, the human body breaks down protein-rich foods, such as meat, fish and dairy, into amino acids. These are then reassembled into different proteins the body needs to grow and function. Aspartame is made from two of these amino acids. Amino acids are a natural part of our diet from our very first days, and the two amino acids in aspartame are also in breast milk.

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Unraveling the Mystery of Sweet Taste

Consumers stand to benefit from scientists' continual revelations of the mechanisms behind sweet taste perception.

Paula Frank, Contributing Editor

Human taste biology is a complex process, much of which scientists have only recently discovered, thanks in part to the Human Genome project. It is amazing to realize that formal publication of the discovery of genes that code for bitter taste receptors occurred a mere seven years ago. This research opened the door for additional discoveries and identification of other chemosensory receptors, such as those associated with sweet taste. Although the effect of chemicals found in food and food ingredients on taste receptors is not yet fully understood, biologists and food scientists continue to collaborate on ways in which food product development involving sweet taste can be optimized for consumer preference.

In the meantime, food scientists continue their search for the "Holy Grail" of ingredients that both function and taste exactly like sugar. Sugar is and has been the preferred choice of sweetener but often is replaced in low- or no-sugar added products targeted toward the consumer, who either faces or fears the perils of obesity and diabetes. Not only are nutritive sweeteners such as sugar or corn syrup often replaced fully or in part by non-nutritive sweeteners and/or polyols (sugar alcohols), but also by flavoring agents and/or natural compounds that impart sweetness.

Sensing Sweet Taste

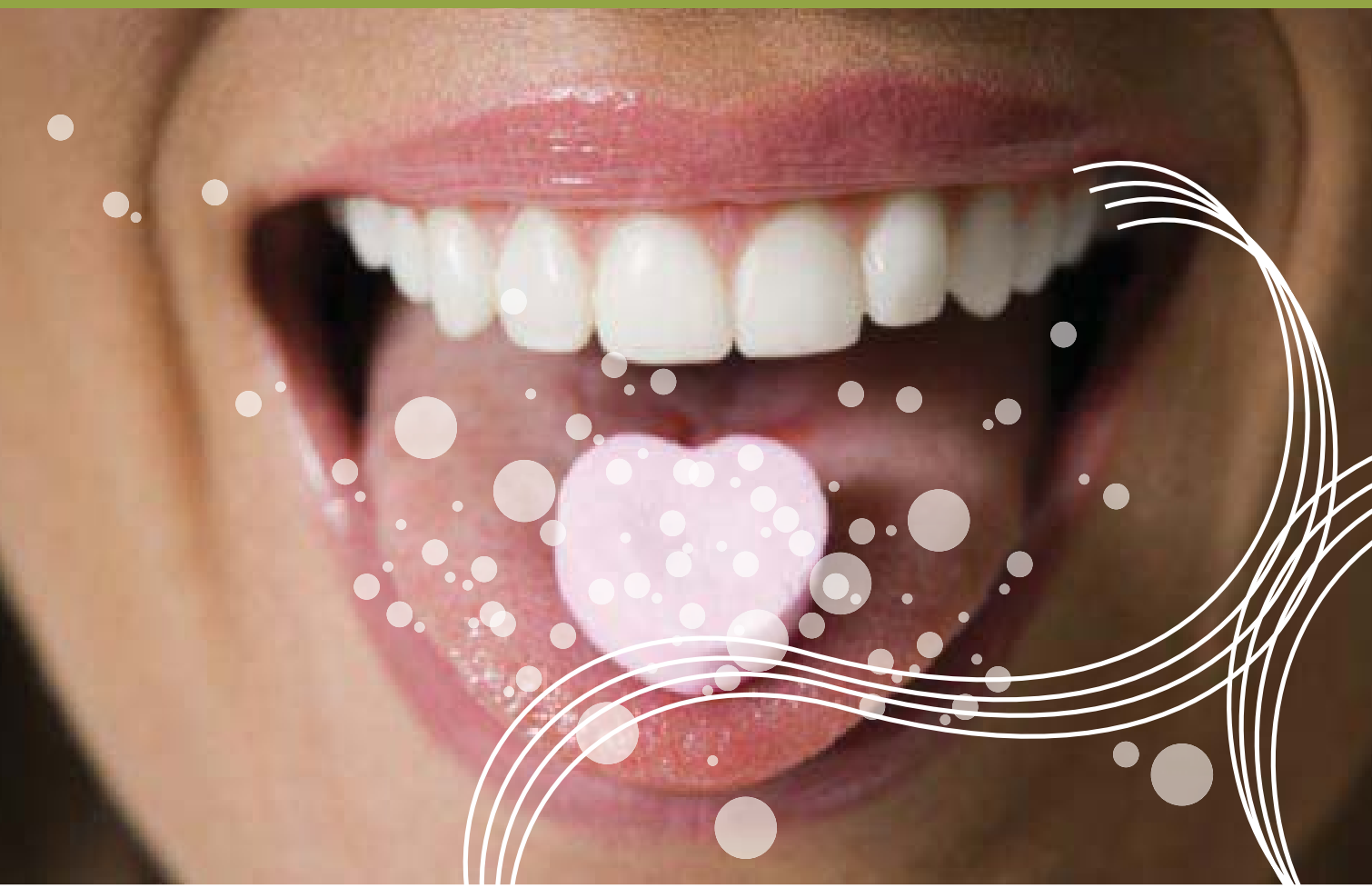
What is now known about taste perception is far different from that previously thought. As food scientists, many of us were shown a map of the tongue with certain regions delineated as locations specific to certain taste qualities (i.e., sweet, salty, bitter, sour or umami). Although there are certain areas of the tongue that are more sensitive to certain tastants, taste buds can detect all five tastes.

Bitter and sweet use essentially the same receptor and transduction system; the receptor types are similar, and the way the signals inside the cell are coded and conveyed to nerves is similar.

Back in March and April of 2000, two separate groups of researchers affiliated with the Howard Hughes Medical Institute (HHMI) published their findings of bitter taste receptor genes in the esteemed science journals *Cell* and *Nature*, respectively. An April 6, 2000 HHMI research news brief describes the taste receptor mechanism as follows: "Receptors are proteins that nestle in the cell's surface and bind specific chemicals in much the same way that a key fits into a lock. When activated by a chemical, receptors trigger molecular signals within a cell that alter the cell's metabolism. In the case of taste receptors, chemicals impinging on the taste buds trigger nerve impulses that travel to the brain, where taste information is processed."

One of the research teams based its investigation of bitter taste receptor genes on the previous research of

Make their taste buds celebrate



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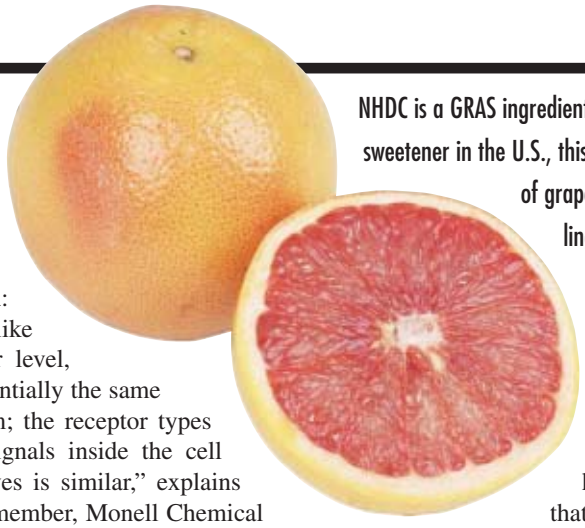


NHDC is a GRAS ingredient. While not approved for use as a sweetener in the U.S., this derivative of the bitter component of grapefruit rinds has a slower onset, lingers longer and has a different overall flavor profile than sugar.

another HHMI investigator, Robert Margolskee, who had discovered evidence that the receptors for both bitter and sweet chemicals are coupled to a common G-protein signaling molecule. What is now known: "Sweetness detection is most like bitter perception at a molecular level, because bitter and sweet use essentially the same receptor and transduction system; the receptor types are similar, and the way the signals inside the cell are coded and conveyed to nerves is similar," explains Danielle Reed, Ph.D., associate member, Monell Chemical Senses Center.

Gustducin is the name given to the G-protein signaling molecule. According to John W. Kimball, Ph.D., professor emeritus of immunology at Harvard University, the complex of G-proteins was named as such because of its similarity in function to that manifested by the G-protein transducin, which plays an essential role in rod vision. Each G-protein coupled receptor (GPCR) is composed of two sub-units designated as T1R2 and T1R3, which are coupled to the G-protein gustducin. Activation of gustducin by compounds that bind with these two sub-unit receptors results in the sensing of sweetness.

"Recent research has focused on understanding what happens inside the taste receptor cells at the molecular level, when chemicals are present," says Reed. "For sweet, we have learned that the receptor is made from two proteins that intertwine and offer a complex external surface that can interact with a variety of sweeteners. Although the details are not completely understood, this discovery is consistent with a puzzling observation that both simple, small molecules such as glucose, as well as large, complex proteins such as monellin, can taste sweet."

Tastes Like Sugar

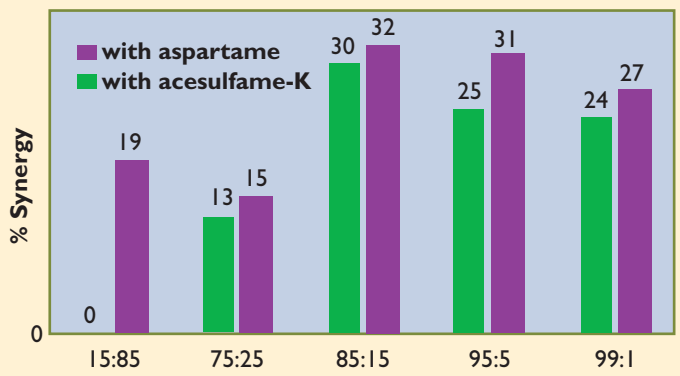
Sugar or sucrose, a disaccharide comprised of glucose and fructose, remains the gold standard when formulating a product's sweetness profile. Product developers search for the blend of sweeteners that most closely matches sucrose's temporal profile, or its onset, intensity and duration in a given food matrix. Other factors such as functionality, mouthfeel, ingredient interaction, processing and storage stability are naturally considered as well. Sugar and sugar alcohols have similar temporal profiles in that sweetness intensity increases with progressively higher concentrations of sweetener, notes Ronald C. Deis, Ph.D., vice president of technology for a well-known sweetener supplier. While high-intensity sweeteners follow a similar course at low-use concentrations, sweetness intensity eventually levels off at higher concentrations.

Food scientists are taking a closer look at a wide range of binary and ternary blends of sweeteners to assess how closely their temporal profiles mimic that of sucrose. Blending sweeteners reduces the probability of a phenomenon known as adaptation, where repeated exposure to a particular sweetener results in a loss of sensitivity, notes Deis. In addition, many combinations of sweeteners have demonstrated synergistic properties. For instance, the combination of sucralose and acesulfame-K gives a more sucrose-like profile than either ingredient used alone.

Researchers from Duke University recently collaborated with scientists from a high-profile sweetener supplier on a study of binary and ternary sweetener blends, in an attempt to discover the optimal profile that most closely matched that of sucrose. The study incorporated sucralose,

When erythritol is blended with minute quantities of aspartame or acesulfame-K at a sweetener equivalency ratio (SEV) of 10%, the resulting synergistic sweetness intensity can be boosted by as much as 30%.

Synergistic Properties of Erythritol



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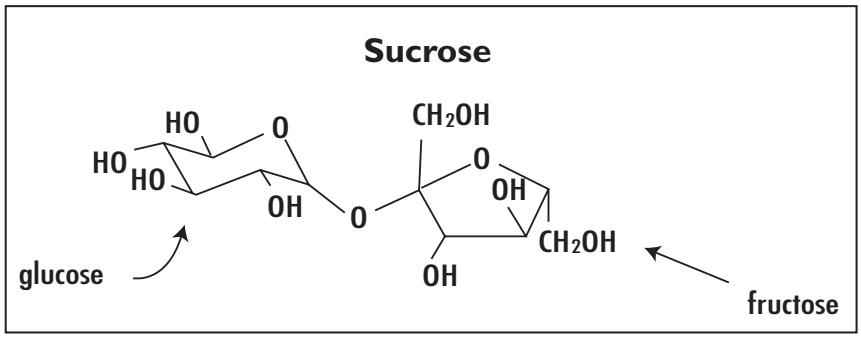

Sugar or sucrose, a disaccharide comprised of glucose and fructose, remains the gold standard. Product developers are searching for blends of sweeteners most closely matching sucrose's temporal profile.

neotame, mannitol, acesulfame-K, sorbitol, saccharin, fructose, sucrose, cyclamate (not approved in the U.S.), stevioside (a compound found in stevia with a slightly bitter component), aspartame, rebaudioside-A (a compound found in stevia that is more sucrose-like than stevioside), neohesperidin dihydrochalcone (NHDC), alitame and the protein thaumatin. Blends that contained thaumatin were associated with the latest time to maximum sweetness intensity, perhaps because of the size and complexity of the protein's structure. Blends containing stevioside, neotame, NHDC, alitame or rebaudioside-A reportedly had later times to maximum sweetness than that exhibited by blends containing sugars or sugar alcohols.

Beyond Sweeteners

Striving for the ultimate flavor profile of sugar is not only accomplished by ingredients categorized as sweeteners, but by other ingredients as well. A host of products exist that either in or of themselves act as sweeteners or have a sweetness-enhancing effect on the food matrix within which they are used. The average consumer may consider them sweeteners, but in the U.S., some of these products fall under the "dietary supplement" category, while others are considered flavors or flavor enhancers.

Stevia, a glycoside formed by three molecules of glucose and one of steviol (made from the South American plant *Stevia rebaudiana*), is one such product. While considered a food additive in countries such as Japan, Brazil and China, it is labeled as a dietary supplement in the

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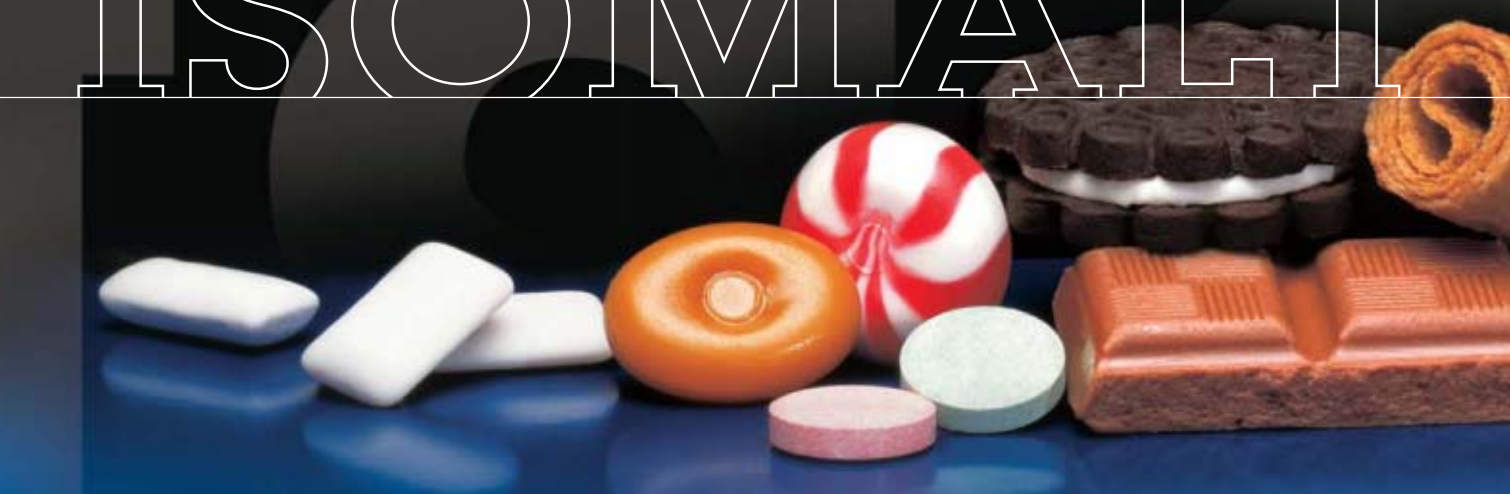

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U.S. until additional information is gathered on its safety. Stevia, marketed as a more natural sweetening alternative, is approximately 300 times as sweet as sugar with a slower onset and a longer duration. It is also heat- and pH-stable, non-fermentable and does not invoke a glycemic response. The FDA could reportedly be petitioned to approve stevia as a food additive—not an unlikely scenario considering the fact that Coca-Cola Co. and its joint-venture partner, a well-known supplier of sweetener ingredients, have filed 24 patent applications for the ingredient in the U.S. There are several different variations of stevia products coming to market. Optimal varieties that have a clean sucrose-like taste without the presence of a bitter aftertaste are being produced through plant-breeding techniques.

Another product, neohesperidin dihydrochalcone (NHDC), is also not approved for use as a sweetener in the U.S., but is considered generally recognized as safe (GRAS) by the Flavor and Extract Manufacturers Association (FEMA) as a flavor modifier when used at low concentrations in foods and beverages. NHDC, a derivative of the bitter component of grapefruit rinds, has a slower onset, lingers longer and has a different overall flavor profile than sugar. However, NHDC reportedly has a strong synergistic effect when used with other sweeteners such as aspartame, saccharin, acesulfame-K, cyclamate and sugar alcohols.

A group of proteins that have been isolated from plants grown in tropical rainforests includes thaumatin, brazzein, monellin, curculin, mabinlin, miraculin and pentadin—each of which has sweet or taste-modifying properties. Although brazzein is the most heat-stable and pH-stable of the group, thaumatin is the only protein of those named that has GRAS status as a flavor modifier. Thaumatin is 10,000 times sweeter than sugar on a molar basis. According to Ravi Kant, miraculin acts as a taste-modifying protein in that it causes the sweet taste receptor to respond to acid, thereby causing the sour compound to taste sweet (*Nutrition Journal*, 2005, 4:5).

Ammoniated salts of glycyrrhizic acid are naturally occurring flavoring compounds characterized by their sweetness. Ammonium glycyrrhizinate (AG) is the fully ammoniated salt of glycyrrhizic acid. Both AG and mono-ammonium glycyrrhizinate (MAG), in and of themselves, contribute a sweetness that is 50 times that of sugar, but also possess a licorice aftertaste. Treatment with 5'-nucleotides represses this licorice flavor without suppressing the sweet character. One of the issues associated with AG and MAG is the slow onset of sweetness and the lingering sweet aftertaste. The addition of certain inorganic phosphates has reportedly resulted in an improvement in both of these temporal characteristics, such that sweetness onset is improved and the lingering aftertaste reduced.

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Why Study Taste Perception?

While enhanced consumer perception resulting in an increase in a product's marketability certainly provides impetus for understanding human taste perception, other reasons exist as well. The reduced ability to taste—a condition known as hypogeusia—can indicate the presence of an adverse health condition. In addition, knowledge of taste perception may help food scientists develop products that have greater appeal to an aging population that theoretically suffers some loss of taste sensation.

"It is important to distinguish between the ability to detect sweetness and the degree to which people enjoy sweetness," says Reed. "The inability to detect sweetness is extremely rare in humans and is not an important part of clinical medicine or health research. However, researchers do study the degree to which people 'enjoy' highly sweetened foods and drinks, and the results here indicate that children, especially during growth spurts, enjoy intensely sweet drinks more so than older people and children not actively growing. In adults, the preference for highly-sweetened foods and drinks is associated with both alcoholism and, perhaps, depression."

There are many other ways in which further research might shed light on taste perception, such as ways in which medicines can be made more palatable by suppressing bitter compounds, or ways in which foods can be customized for specific populations based on known sweet taste preferences. Taste perception is not constant across gender, race and age populations, or even necessarily within common genetic origins. Reed and her colleagues address many of these issues in an article entitled "Diverse Tastes: Genetics of Sweet and Bitter Perception," (*Physiological Behavior*, 2006, June 30; 88(3): 215-226). For instance, how might DNA variance in taste receptors affect sensitivity to taste perception? Another area of interest, as described by Reed, et al., is the effect of the concentration of the hormone leptin on human physiological and behavioral responses to sweets, since there is evidence that these responses are suppressed in studies conducted with rodents.

The world of genetics has opened up a vast array of possibilities for future research in the area of taste perception. For instance, one flavor ingredients company recently received a patent (U.S. Patent #7,223,551) for assays that detect the specific binding of compounds to the T1R3 taste receptor. This patent provides the company with a method for identifying compounds that "modulate or elicit" sweet taste. Collaborations between food scientists, biologists, psychologists and the like surely will produce some phenomenal results over the decades to come. pf

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Yogurt Base:
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1 tablespoon vanilla
1 tablespoon honey
1 cup water
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Starch and Hydrocolloid Gum Formulation Considerations

Ingredient characteristics, processing and interactions are crucial factors when formulating with starches and hydrocolloid gums in smoothie and frozen dessert applications.

Elizabeth Mannie, Contributing Editor

What can be better than a cold and creamy chocolate mousse pie or a strawberry banana smoothie in the summertime? However, in the heat of summer, these delicate frozen desserts and smoothie products often are exposed to freeze/thaw conditions during shipping and storage. Texture issues can occur if the products are not stabilized with gums and/or starches. These texture-saving ingredients are available in many types and forms and are able to address even the most complex food system, processing, shelflife or storage conditions.

"Smoothness is not a well-defined term," states Ross Clark, distinguished research fellow at a well-known gum supplier. He says, "At least four things can make a frozen dessert or smoothie seem not smooth." These are graininess from protein precipitation, ice crystal growth, a thin viscosity and insoluble materials such as pulp, seeds or added minerals (like in calcium fortification). The following are some ways gums can help maintain smoothness or creaminess.

Hydrocolloid Gum Addition

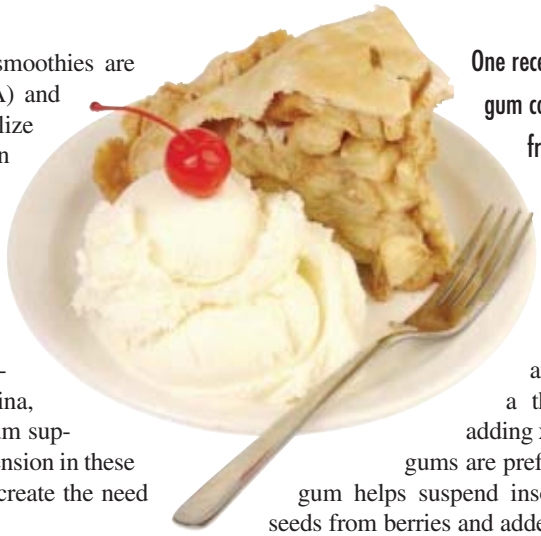
Gums are typically used at a range of 0.025% up to approximately 0.5%—sometimes up to 0.8%, depending on the combination of ingredients used. At times, emulsifiers are used in gum blends and, in those cases, the use levels for the blend are significantly higher. In frozen desserts and smoothie-type applications, combining gums is more common than using a single gum, because each gum has unique functions; also, there is typically more than one issue to address in these products.

Modified food starch has been used as a component in premium texture ice cream stabilizer blends in order to bind water, provide bulk and prevent ice crystallization.

The functions of gums in frozen dessert or smoothie systems include inhibition of ice crystal formation; improvement of body and mouthfeel (especially in reduced-fat and -sugar products); suspension of insoluble minerals, seeds, pulp, cocoa or inclusions; and the protection of proteins from precipitation due to low pH.

"Gums stabilize emulsions prior to freezing and prevent 'whey off' after heat treatment. 'Whey off' is a condition where the casein and whey in the milk become separated. This can happen due to pH change, heating or other conditions that destabilize the casein. Gums can be used to stabilize the less stable casein fraction. Air cells are stabilized for consistent overrun and slower melt," contributes Ray Valli, senior scientist at a major gum supplier.

ingredient challenges



"The most common gums used in smoothies are pectin, propylene glycol alginate (PGA) and cellulose gum. All three of these stabilize proteins at low pH. Each has its own unique mouthfeel attributes and label declaration that will help developers select which one is right for them. Pectin is well received by consumers and has a very light mouthfeel. Cellulose gum has a heavier mouthfeel, while PGA can sound negative to consumers on a label," explains Wanda Jurlina, technical service manager at a major gum supplier. There is also more interest in suspension in these systems. Insoluble fibers and minerals create the need for different gum/hydrocolloid systems.

"For suspension of particulates in acidified protein systems, blends of gums are often required to achieve suspension and protein stability. At this time, the two main choices for these blended systems are gellan and cellulose gum or cellulose gel and pectin," adds Jurlina.

"For frozen desserts, any products that help control water will impact how ice crystals form and how they grow. Lots of smaller ice crystals will give a much smoother product than fewer larger ice crystals. The goal in stabilizing a product is to promote smaller ice crystal formation to ensure a smoother, creamier product through the shelflife and abuse," Jurlina adds.

"In the case of graininess from protein precipitation, a cellulose gum or pectin is typically added to serve as a protective colloid, because they prevent complete precipitation of the protein. To inhibit ice crystal growth, locust bean gum or other galactomannans are especially effective. To make a thin or runny product thicker, adding xanthan, cellulose gum or pectin gums are preferred ways to add body. Gellan gum helps suspend insoluble materials such as pulp, seeds from berries and added minerals," explains Clark.

> One recent study showed that xanthan gum could stabilize tapioca starch during freeze/thaw conditions, reducing the amount of syneresis.

> Use levels depend on the composition of the blend, which is usually proprietary to the supplier.

Formulating and Processing Considerations

"Fat in a formula always adds body and makes a more thick and rich mouthfeel. Low pH tends to make things seem harsher, while low moisture thickens. In most cases, these properties cannot be adjusted, due to the product identity. For example, more fat may improve texture, but in a low-fat or low-calorie product, this may not be possible," adds Clark.

"Fruit is used mainly for flavor, but cooked or canned fruit is softer and less pulpy than fresh fruit, so the product will be smoother and less pulpy in the mouth. Some fruits promote creaminess (such as bananas), because they have high amounts of starch, which adds viscosity and creaminess," says Valli. Added whey or soy protein usually increases creaminess as well, unless the proteins precipitate in a low-pH system, resulting in a powdery or grainy product. As more milk solids are added, protein reactions occur, especially with heat abuse. Carrageenans can protect the

Gums in Frozen Desserts and Smoothies

Product Type	Typical Stabilizer Components	Use Range
Standard ice cream (10% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.25%-0.30%
Premium ice cream (12%-20% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.10%-0.30%
Lower fat ice cream (0.5%-10% butterfat)	Xanthan, CMC, guar, LBG, carrageenan, MCC	0.26%-0.85%
Soft serve ice cream (5%-10% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.15%-0.35%
Frozen yogurt—hard pack (2%-3.5% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.20%-0.40%
Frozen yogurt—soft pack (2%-3.5% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.30%-0.40%
Sherbet (0%-3% butterfat)	Xanthan, CMC, LBG	0.22%-0.35%
Sorbet (0%-3% butterfat)	Xanthan, CMC, guar, LBG, carrageenan	0.10%-0.15%
Milkshake (0.5%-3.5% butterfat)	Xanthan, guar, LBG, carrageenan, MCC	0.16%-0.18%
Smoothie (0%-3% butterfat)	Xanthan, CMC, pectin, guar, LBG	0.08%-0.20%
Flavored milk (2%-3.5% butterfat)	Carrageenan, CMC, LBG	0.025%-0.30%
Water ices (popsicles)	Pectin, LBG, CMC	0.30%-0.45%

Source: CP Kelco, Applications Development Lab

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proteins at neutral pH, but they are less effective at low pH. Pectin and carboxymethyl cellulose (CMC) are better choices for low-pH products.

"While there is a lot of overlap in gum functionality in the final product, it is critical to match the gum properties with the processing requirements," says Valli. "For example, the stability requirements for a mix depend on batch size and how long the batch sits before freezing. If a mix sits around a long time before freezing, then guar or locust bean gum (LBG) cannot be counted on to maintain the emulsion. Adding a low level of carrageenan will prevent 'whey off,' and then adding some xanthan gum will ensure that the emulsion doesn't break in the holding tank," he states.

"Other gum considerations are that xanthan, CMC and guar are all cold-soluble, so they contribute to mix viscosity prior to pasteurization. But excessive mix viscosity can create a problem for effective heat transfer. By using some LBG, pectin or carrageenan, initial mix viscosity can be reduced. The heat of pasteurization will fully hydrate these gums so that the mix will develop added viscosity after pasteurization," Valli shares.

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Formulating with Starch

In general, the use level for starches can range from 0.5% to 4% in frozen desserts, depending on a number of factors. Fat content, processing product type and other ingredients all affect the amount and type of starch ingredients used.

Starches have a variety of functions in smoothies and frozen desserts, including creaminess enhancement in low-fat products and freeze/thaw stability. Starches are commonly modified by processing, chemical or enzymatic means, with the final starch properties determined by the specific starch modification. This helps achieve the desired properties and functions in finished products.

For example, cross-linking increases starch stability during heat and shear and in lower pH systems. Substitution increases the water-binding capacity of starch, which helps control syneresis in dairy and frozen desserts.

Starch Applications

"Frozen desserts have come a long way since the snow cone," explains Joni Simms, manager, food ingredients technical service, Americas and Europe, at a well-known starch supplier. Consumers still want creamy taste and texture, often with the added benefits of low-fat and no-sugar-added. These considerations put demands on processors as they try to balance the fat, water and sugar in a formula, while maintaining the stability of the product. Maintaining stability requires managing the freezing point and temperature fluctuations during storage

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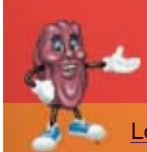

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Starches can enhance the sensation of slipperiness in the mouth and promote a fast, clean melt-away in formulas with powdery ingredients like cocoa or soy.

and distribution. Starches can be used in these applications to further improve texture. As an example, modified food starch has been used as a component in some premium texture ice cream stabilizer blends. The purposes of the stabilizer blends are to bind water, provide bulk and prevent ice crystallization.

Dairy desserts such as frozen mousses, which are aerated, may benefit from using an instant starch that holds moisture and provides viscosity. In this case, delayed hydration may be a necessary function in the chosen starch.

"For smoothies, different starches can be added to increase thickness, improve mouthfeel and lubricity of a beverage, without becoming slimy—as can be the case when using high levels of other hydrocolloids," contributes Suzanne Mutz-Darwell, marketing manager for a starch supplier. Additionally, starch can act as a partial replacement for milk solids non-fat (MSNF) in products, delivering texture while saving costs.

Starch suppliers were showing plenty of smoothies at the recent IFT in Chicago, including a mango/passion fruit smoothie with appealing flavor and texture, plus added fiber. The proprietary blend of modified starches and fibers allowed the natural flavor to shine through and provided a creamy, pulpy mouthfeel, in addition to a "good source of fiber" claim. When adding nutritional ingredients to smoothies, texture can be affected.

Sensory Aspect of Creaminess

"Creaminess or smoothness is often viewed as a bit of a vague consumer description, but even so, it can be improved by a variety of approaches," explains Mutz-Darwell. She goes on to say, "Creaminess or smoothness is enhanced by starch in a number of ways. Maintaining a small ice crystal size in frozen products such as ice cream is one important aspect."

"By controlling the glass transition temperature and the rheological characteristics of the unfrozen phase in a frozen dairy system, starch ingredients can control the size of ice crystal development, improve heat shock tolerance and maintain shape in frozen novelties—all of which contribute to the improved textural characteristics of frozen desserts. Additionally, there are other starch-based texturizers that can act as a fat mimic and enhance lubricity to further enhance the creamy eating experience," Mutz-Darwell states.

Her company's sensory department has been able to break down the "creaminess" experience desired into specific, well-defined, sensory texture attributes that become actionable targets for product developers to focus on when they seek to develop a consumer-preferred texture. Once the experience is mapped for a specific product, then the proper texturizing system can be selected from the vast toolbox of available texturizers that vary in origin, processing and, ultimately, in label declaration. Some examples of labeling would include tapioca maltodextrin, food starch-modified or physically modified native starches.

Co-texturizers

Described as "co-texturizers," one starch supplier provides a line of starch-based ingredients contributing a range of textures in a variety of dairy products, including frozen desserts and smoothies. These products are designed to work on top of an exist-

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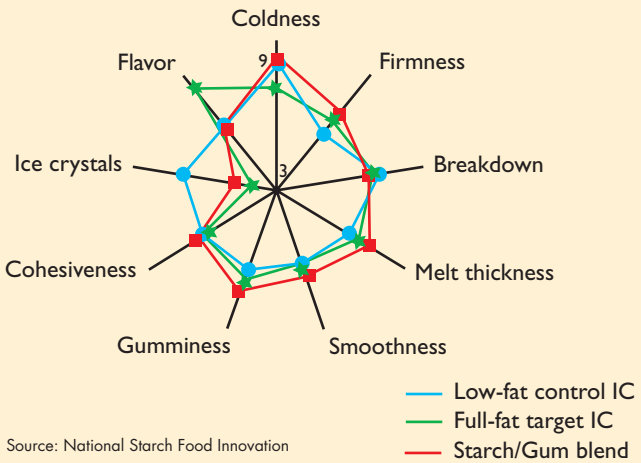

Source: National Starch Food Innovation

Adding a specialty starch to a gum emulsifier blend in low-fat ice cream brings these key sensory attributes closer to that of its full-fat counterpart.

ing texture structure, hence the name co-texturizers. Many formulators think of starch as primarily a viscosifier, used to control the thickening aspect. However, co-texturizers do not add viscosity, but instead provide incredible texture versatility. "These products provide a new set of tools that are versatile, easy to use and cost-effective," adds Mutz-Darwell.

Starch can aid in the dispersion and suspension of fruit pieces within a product; however, it does not usually interact with fruit ingredients. Typically, fruit pieces or preparations are blended into the dairy base at the end of the process. Food processors are offered flexibility in selecting starches that best suit their process, equipment and product needs. Some starches can be added at the beginning of a process, withstanding the heat from pasteurization and the shear from homogenization, or later in the process, when a starch must be dispersed in a cold liquid system (such as with an instant starch).

Sometimes ingredients in a formula, such as chocolate, nuts or soy powders, can affect creaminess. In these cases, starches are available to enhance the sensation of slipperiness in the mouth and promote a fast, clean melt-away. Others can enhance the full cream effect by delivering a full mouth-coat-

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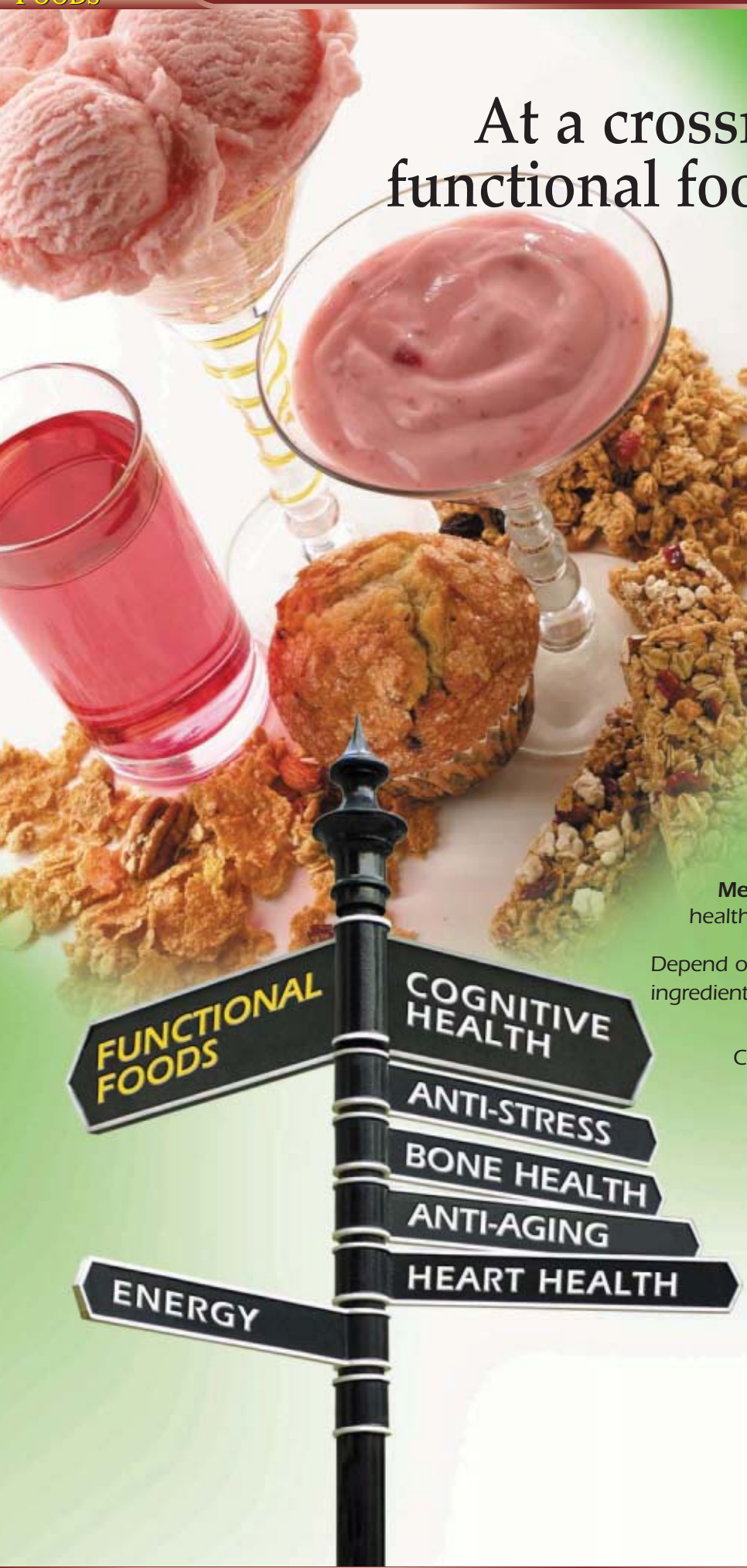

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See Food Master-*INGREDIENTS*, p. 155

ing effect. Starches can mask the graininess and off-flavors of some powdery ingredients or of vitamin, minerals or other added ingredients in nutritional-type smoothies.

Chemical Property Considerations

One must consider the chemical properties of a formula when choosing starches and other texturizers. Fat, pH, moisture and other properties affect texture and the choice of a texturant. Shear, pH and heating conditions affect how the starch cooks out. Therefore, it is important to select a starch that is stable enough for a specific process or pH to obtain optimum functionality.

When products are frozen, they often are exposed to varying temperatures and altitudes that cause expansion and shrinkage during shipping. Depending on what ingredients are present and the processing, shipping and storage conditions, a formulator may need a combination of starches, gums or other texturizers in one finished product.

A recent study published in *Food Hydrocolloids* indicated that xanthan gum could stabilize tapioca starch during freeze/thaw conditions, reducing the amount of syneresis. This research may offer formulators additional avenues into texture enhancement. The chemical structure of xanthan gum was most effective compared with other gums such as locust bean, guar and konjac-glucomannan for stabilizing tapioca starch gels. It was found that treatment conditions for reduction of starch retrogradation were optimized at a level of 0.5% xanthan gum with a freezing rate of 2.3°C per minute. Not only was xanthan gum found most effective in this study, it is also (according to the authors) one of the few hydrocolloids that have avoided price increases.

End users should carefully consider what they want from the final product and give clear guidelines to suppliers who can then suggest gums and blends of gums to meet customer expectations. Fat, milk solids and pH levels all are critical parameters that affect gum choice and stabilizer blend levels. As fat is reduced, stabilizers are typically added to maintain the mouthfeel. Different gum combinations often are needed to get the right mouthfeel. Pf

Website Resources:

www.PreparedFoods.com — To look up past articles on viscosity, texture, starch and/or hydrocolloid use, type words or phrases into the search field

www.cpkelco.com — Information on gums and their functions

www.nationalstarch.com — Information on starches, modified starches and other texturizing ingredients

www.tateandlyle.com/TateAndLyle/products_applications/_applications/food_beverage/default.htm — Starch product and application information

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Formulating Foods & Beverages for Enhanced Immunity

There has been growing consumer interest in products that assist with immunity. Ingredients such as prebiotics, probiotics, certain vitamins and minerals, as well as cranberries and even omega-3s, may be useful in such formulations.

Elizabeth Mannie, Contributing Editor

One of the top trends in foods for 2007, if not the top trend, is nutritional health. Healthy products, which up until recently have been referred to as "functional foods," include items that enhance immunity. Many ingredients have been found to enhance immunity and are popping up in new products on store shelves everywhere. Some of the more common ingredients are discussed here.

Prebiotics and Their Sources

Prebiotics are indigestible food ingredients that encourage the growth of bacteria as they pass through the digestive system. Their role in improving immunity is a subject of great interest to food manufacturers.

"Prebiotics enhance the immune system in two ways," states Lorraine Niba, business development manager for a well-known starch supplier. "First, by enabling the growth and proliferation of beneficial bacteria, the pathogenic and harmful bacteria are depleted and destroyed. Secondly, fermentation of prebiotics produces short chain fatty acids and lactate, which lower intestinal pH and maintain integrity of the epithelial cells that line the colon (colonocytes). This lower pH and stronger colonocytes protect against the harmful bacteria," she adds.

"Prebiotic fibers have many sources and are naturally found in grains like wheat, corn, oats and barley; legumes like beans, peas and soybeans; fruits and vegetables like apple and grapefruit pectin; and roots like chicory. Milk oligosaccharides also have prebiotic activity," offers Niba. "Many new ingredients are showing great potential as commercial prebiotic fibers. These include: isomalto-oligosaccharides (which contain a combination of isomaltose, isomaltotriose and panose), soy oligosaccharides (raffinose extracted from soy whey) and xylo-oligosaccharides," Niba explains.

The market for probiotics is growing, as U.S. consumers grow more accepting of the idea of "healthy bacteria." U.S. beverage manufacturers introduced 528 new yogurt and probiotic drink products from 2004 to 2006, according to Mintel. Kraft Foods' LiveActive Marble Pouch is an example launched in Canada this year.

Easily incorporated into foods and beverages, many prebiotic fibers are water-soluble, disperse extremely well and can be added to a wide variety of foods and beverages such as breads, baked goods, nutrition bars, dairy products, soymilk, fruit juices and smoothies.

Soluble corn fiber and resistant starches are promising prebiotics that offer a variety of benefits to both producers and consumers. Prebiotic soluble corn fiber is a smaller molecular weight compound than resistant starch, and the

1-2 and 1-3 linkages cannot be broken down in the human body. Resistant starches are protected from digestive hydrolysis by three methods: seed coats, specific intact granule structures, or crystallized or retrograded non-granule structures.

"Soluble corn fiber has been found to increase the numbers of probiotic organisms found in the large intestine. These organisms can ferment the soluble corn fiber to produce beneficial fatty acids such as butyrate, which is a fuel for intestinal cells and associated with intestinal health," states Lisa Sanders, a nutrition scientist (R&D) for a well-known starch supplier.

"While there are no official recommendations for amounts of prebiotic fiber to be consumed in a day, soluble corn fiber has shown beneficial prebiotic effects at 12g to16g per day. It has been well-tolerated without adverse effects at doses equivalent to 100% of the daily value for fiber, which is 25g per day for women and 38g per day for men, according to the Institutes of Medicine," states Sanders.

"Currently, studies are investigating the immune-enhancing effects of soluble corn fiber. In vitro studies show encouraging results, where it has similar prebiotic effects to inulin, a well-researched fiber for immune enhancement," she adds.

"Soluble corn fiber can be successfully formulated into all kinds of foods and beverages. Easy to use, it is a transparent fiber, meaning there is no change to color or flavor. Functioning like corn syrup, it can be easily added wherever corn syrup is used. However, being non-sweet, it can also be used in savory applications as a bulking agent or for fiber addition. Calorie reduction is possible, as it is only 2Kcals per gram," states Michelle Schwenk, food scientist at a supplier of soluble corn fiber and resistant starch.

"Resistant starch is the only starch that has prebiotic activity because it is resistant to digestion, and thus reaches the colon. Other starches are digested and do not reach the large intestine," explains Niba. "When prebiotic fibers are selectively metabolized (fermented) by colonic bacteria, they produce short chain fatty acids with health benefits."

The different types of probiotic cultures used in Trés Jelée target different regions of the gastrointestinal tract. *Lactobacillus acidophilus* is in the product to target the small intestine. *Bifidobacterium longum* and *Bifidobacterium lactis* target the large intestine. Some (but not all) of the potential health benefits supported by clinical studies are listed.

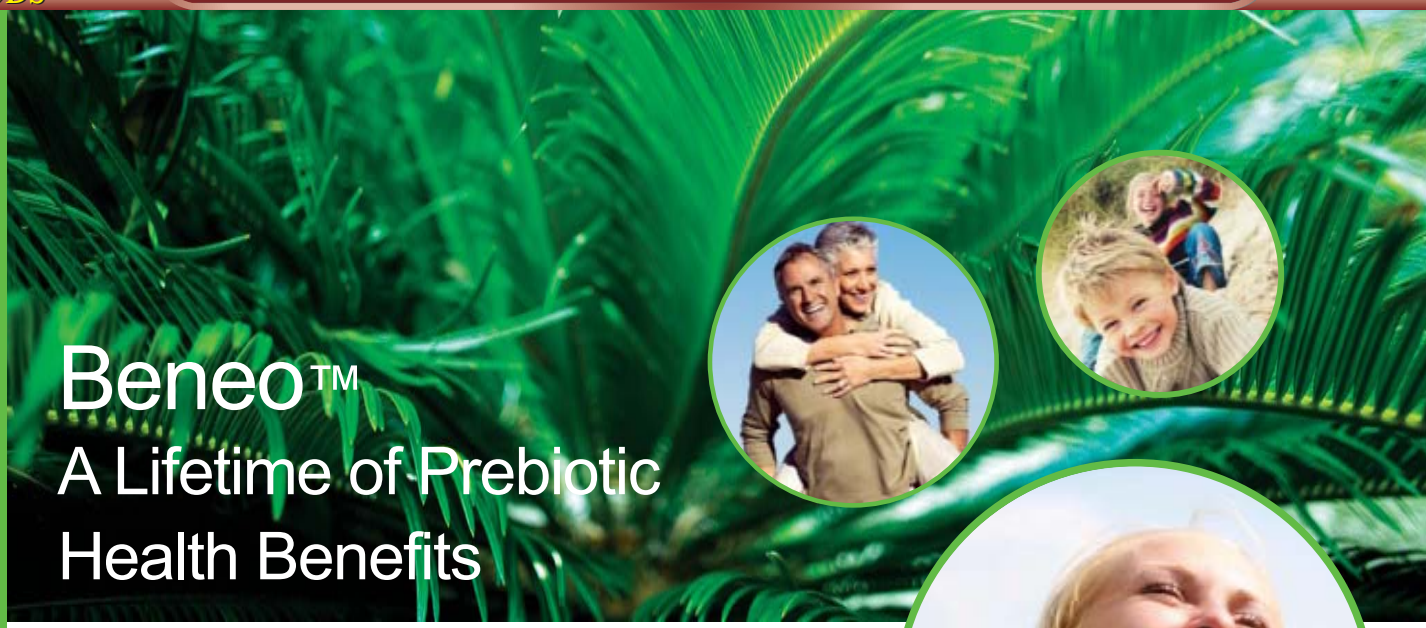
Probiotics

Probiotics are bacteria that can be added to food products that will enhance beneficial fermentation in the digestive system. Probiotics ferment differently, depending on the specific nature and structure of the prebiotic fiber present. Probiotic organisms like bifidogenic bacteria and *Lactobacilli* rapidly ferment prebiotic fibers containing fructo-oligosaccharide chains. On the other hand, a wider range of bacteria including *Saccharolytics* more slowly ferment prebiotics that contain dextrin chains. "Because of these differences, a combination of different types of

Health Benefits of Specific Probiotic Organisms

Bifidobacterium longum	*Bifidobacterium lactis*	*Lactobacillus acidophilus*
Dominant species of Bifidobacteria detected in humans; only species to regularly harbor plasmids	Reduce incidence of rotavirus diarrhea, antibiotic-associated diarrhea and travelers' diarrhea	Potentially alleviate duration and incidence of acute diarrhea, travelers' diarrhea and diarrhea in antibiotic-treated patients
Diarrhea prevention in antibiotic-treated patients	Reduce severity of atopic dermatitis	Help prevent yeast infections and bacterial vaginitis in women
Cholesterol reduction	Shown to modulate the immune system upon oral vaccination	Immune stimulation
Alleviation of lactose intolerance symptoms	Oxygen tolerant, improving its ability to survive during food processing	Survives passage through GI tract better than some other probiotic bacteria
Immune stimulation	Known to survive passage through GI tract better than some other probiotic bacteria	
	Cancer prevention	

Source: University of Minnesota, Department of Food Science and Nutrition, graduate student



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As for seniors, results from the Crownalife project (a major initiative funded by the European Union) indicate that Beneo™ synbiotic nutrition helps promote beneficial bifidobacteria in levels which help reverse digestive aging and improve overall intestinal function.

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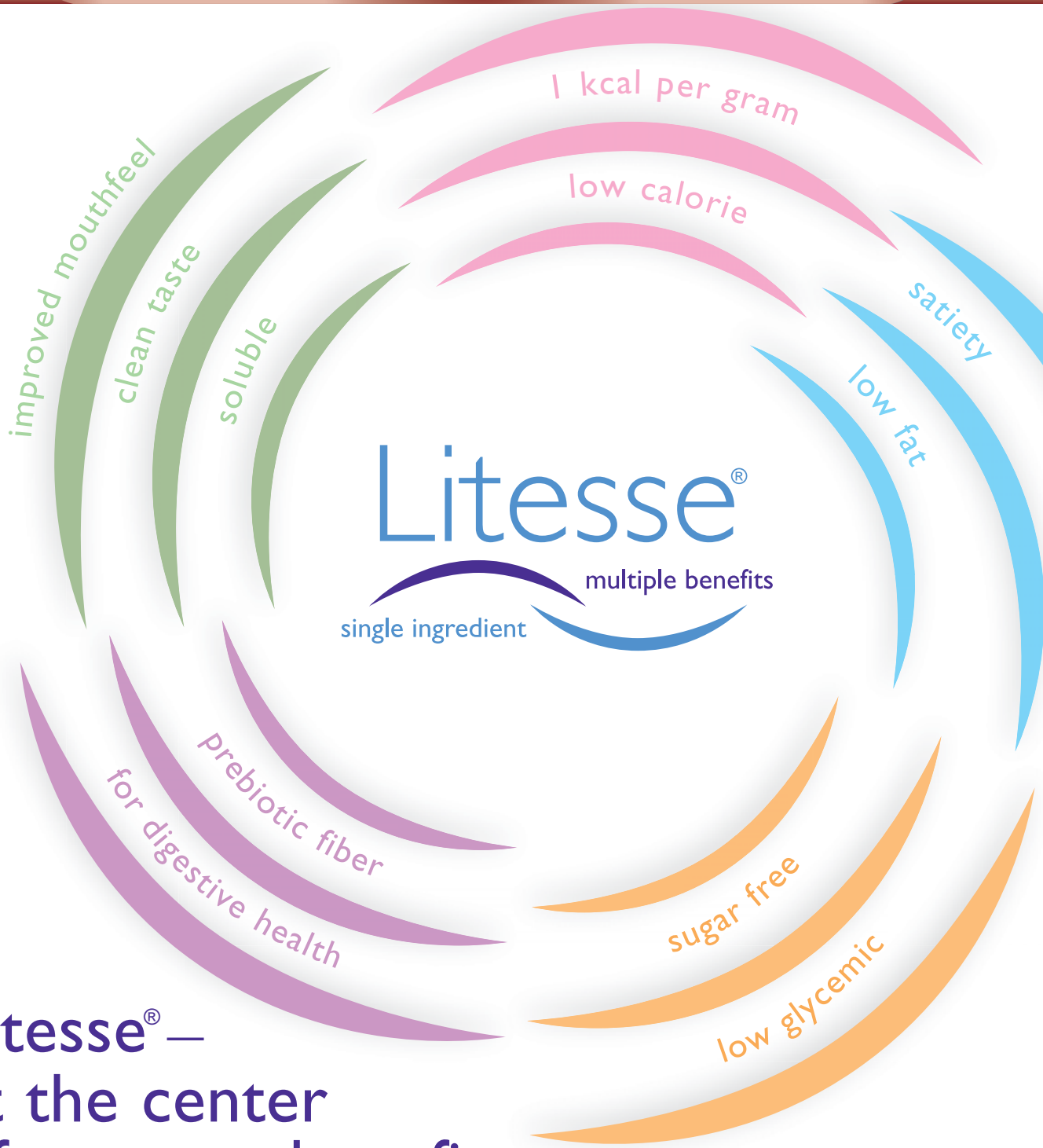

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bacteria in probiotics is more effective," advises Niba.

Probiotics and the Immune System

According to Dan O'Sullivan, Ph.D, associate professor of the Department of Food Science and Nutrition at the University of Minnesota, "Probiotics can enhance the immune system in two ways. First, proteins and other structures on the outside of the organism stimulate a positive immune response when they pass by the immunogenic regions of the GI tract, specifically the Peyer's Patches. And secondly, when some cells die, are broken apart by the bile system and their cell content is released, changes in the methylation of the DNA and deoxycytosine and deoxyguanine (GC) content positively stimulate the immune response."

"The immune system is very complex," explains Mirjana Curic-Bawden, senior scientist for a supplier of probiotics. "A balanced gut microbiota has a positive impact on immune regulatory functions," she adds. "In order to modulate immunity, probiotic organisms must reach immune cells that are capable of recognizing receptors or that are sensitive to probiotic-specific catabolites. Certain probiotic strains belonging to *Bifidobacterium lactis*, *L. casei* and *L. rhamnosus* were shown to stimulate cells involved in immune regulation. Other studies have shown that specific probiotic strains can modulate the ratio of certain markers (Th1 and Th2) and are effective in reducing the development of allergy and setback inflammatory bowel disease," she explains.

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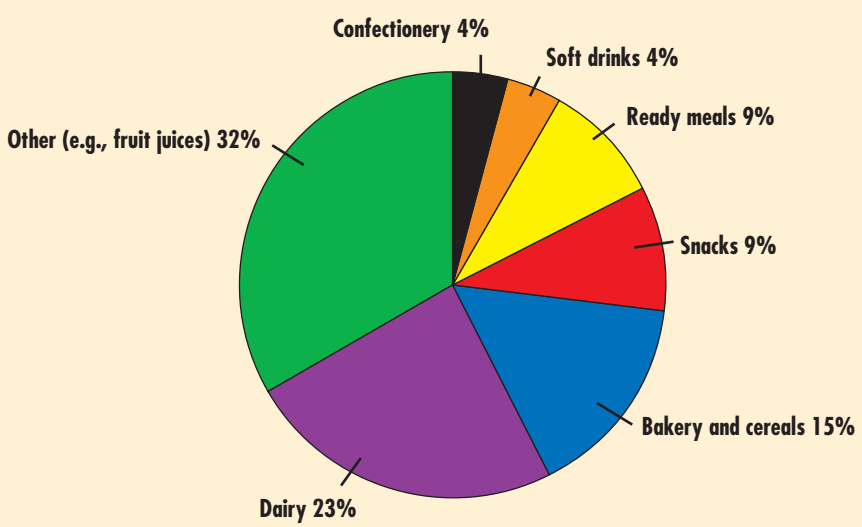
"We do know that as much as 70% of the human immune system is located in the digestive tract, where probiotic bacteria have their effect," offers Gregory D. Miller, Ph.D., M.A.C.N., and executive vice president of Science and Innovation at Dairy Management Inc.™

As researchers continue to investigate different kinds of probiotic bacteria, each strain's unique healthful characteristics will become better understood. For instance, Activia®, a probiotic yogurt from Dannon™ marketed to promote regularity, contains a branded probiotic agent.

"Dairy is an ideal vehicle for probiotics. In fact, most of the probiotics

Categories of Digestive Food and Drink Launches



Source: National Starch (from Productscan, 2006)

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Americans consume today come from the growing category of fermented dairy foods, such as yogurt and yogurt drinks," says Miller. One reason dairy is a good medium for probiotics is that probiotic bacteria need to reach the digestive tract in sufficient numbers to be effective, and the buffering effects of dairy foods appear to help the bacteria survive the trip through the digestive system.

The lower temperatures and shorter storage times associated with dairy products also promote probiotic viability and stability. In addition, probiotic bacteria seem to thrive on the nutrients found in dairy products. Research conducted at the Nestle Research Center in Switzerland showed that *Bifidobacterium longum*, a widely used probiotic strain, actually prefers lactose (milk sugar) over glucose as its primary carbon source. Researchers at the Wisconsin Center for Dairy Research at the University of Wisconsin in Madison are evaluating potential uses for probiotics in cheese.

Chocolate also is proving to be a good conduit for probiotics. Barry Callebaut announced earlier that it would be the first to launch chocolate with probiotics to strengthen the immune system and improve the nutritional profile of chocolate.

Probiotics on the Market

"Most of the probiotics that are currently on the market are of human origin, but it is not an absolute requirement," states Curic-Bawden. Probiotics can be isolated from the GI tracts of healthy infants or from mother's milk. The most common probiotics are *Bifidobacterium*, *Lactobacillus acidophilus*, *L.casei*, *L. reuteri*, *L. rhamnosus* and *L. plantarum*. Certain yeast strains such as *S. boulardii* are also known to have a probiotic effect. Curic-Bawden stresses: "The species name should indicate, but not necessarily mean, probiotic activity." A potential probiotic strain has to have substantial clinical documentation before it can be marketed and promoted as a probiotic. Documented strains receive alphanumeric designations like LGG, BB-12, LA-5, etc.

As U.S. consumers grow more accepting of the idea of "healthy bacteria," the market for probiotics is growing. In 2005, the U.S. market for yogurt and drinkable yogurt was about $9.7 billion, according to Packaged Facts. By 2010, this market is predicted to hit $15 billion. Activia®, the probiotic yogurt from Dannon™, is one of the most successful product launches ever.

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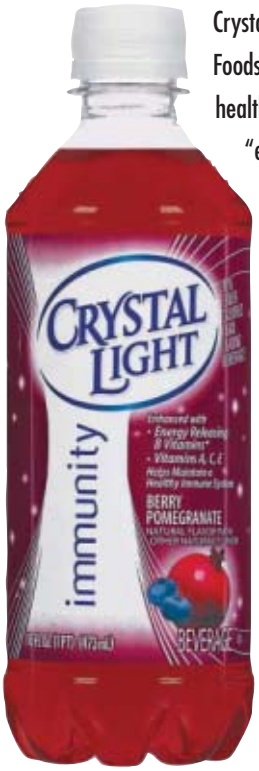

Crystal Light on the Go Immunity by Kraft Foods Inc. professes to "help maintain a healthy immune system" and carries an "excellent source" claim for vitamins A, C and E.

of the top winning products was Trés Jelée, a one-of-a-kind, gelatin-based snack combining soy protein and probiotics in a nutritious, 100-calorie cup. The creation can be eaten as a healthy snack, meal addition or as a light dessert and is a non-dairy alternative that offers a triple blend of probiotic cultures.

The live, active cultures used to develop the product were *Lactobacillus acidophilus*, *Bifidobacterium longum* and *Bifidobacterium lactis*. *Lactobacillus acidophilus* was intended to target the small intestine while *Bifidobacterium longum* and *Bifidobacterium lactis* target the large intestine. The target dose for each organism was 1 X 109 CFU/g. In the original formulation, 1 X 109 CFU/g of each probiotic culture was added to the product. After six weeks of shelflife, it could be verified that over 1 X 107 CFU/g of *Bifidobacteria* and over 1 X 107 CFU/g of *Lactobacillus acidophilus* remained viable in the product. A larger initial dose will be added to the product in future formulations to ensure 1 X 109 CFU/g of probiotic cultures remain in the product through two months of shelflife.

Trés Jelée creates it own unique market niche by combining the benefits of soy protein and probiotics in a product unlike any other. This innovative combination and the interest expressed by many of the IFT attendees has resulted in high expectations for success if Trés Jelée is launched. The process of patenting the product is ongoing, and Trés Jelée may eventually appear on grocery store shelves.

Once the desired probiotic or probiotic mix is identified, food manufacturers have to consider just how much to add to guarantee its effectiveness. "To confer a probiotic effect, the selected strain(s) must be present at sufficient levels, which is strain-dependent and varies from 1 billion to 10 billion per serving (or per day). Hence, probiotics have to be present at high levels, survive during shelflife in application and not change the taste, flavor or appearance of the final product," Curic-Baldwin explains.

Antioxidants, Vitamins and Minerals

According to Diane Hnat, senior marketing manager for a vitamin supplier, "Vitamins A, E and D have direct regulatory

actions on leucocytes by modifying intercellular and intracellular communication pathways." Chronic deficiencies of many trace nutrients, such as zinc and copper, can impair development of the immune system. Often found on food product labels are claims of "good source" or "excellent source" of vitamins or minerals. A good source is considered 10% to 19% of the recommended daily value, where an excellent source is at least 20% of the daily value per serving. "If the positioning of the food is to maintain the body's immune defenses, these amounts would be typical," adds Hnat.

Hnat continues, "Beverages are often a common vehicle for fortification in general; therefore, a beverage with nutrients to enhance immunity would undoubtedly be well-received." A powdered drink mix currently on the market, Crystal Light on the Go Immunity, made by Kraft Foods Global Inc., claims on the label that the product "Helps Maintain a Healthy Immune System." The product is enhanced with vitamins A, C and E and makes an "excellent source" claim for these vitamins.

There are various market forms of vitamins and minerals available that have been developed. Suppliers also provide special blends of nutrients for their clients' specific needs.

New research suggests that North American cranberries may contain compounds called proanthocyanidins that can help ward off certain types of flu viruses by preventing the viruses from attaching to host cells. Other health benefits associated with cranberry consumption include: alleviating and preventing urinary tract infections in women; retarding ulcer-causing *H. pylori* infection; and gum disease prevention.

Antioxidant activity, which enhances immune function, can also be found in a wide variety of plant foods including fruits, vegetables grains, nuts, teas, chocolate and more.

Omega-3 Fatty Acids

Omega-3 fatty acids have shown promise in alleviating symptoms of certain autoimmune diseases including rheumatoid arthritis and ulcerative colitis, an inflammatory bowel disease. Clinical studies looking at omega-3 fatty acid supplements for inflammatory joint conditions such as rheumatoid arthritis often conclude that omega-3 fatty acid supplements can reduce tenderness in joints, decrease morning stiffness and reduce the amount of medication needed to treat rheumatoid arthritis.

Studies also indicate that diets plentiful in omega-3 fatty acids (and low in omega-6 fatty acids) may benefit people with other inflammatory disorders, such as osteoarthritis, by decreasing inflammation.

According to a University of Maryland Medical Center website, preliminary research suggests that omega-3 fatty acid supplements (ALA) may decrease inflammation and improve lung function in adults with asthma. In another small, well-designed study of 29 children with asthma, those who took fish oil supplements rich in EPA and DHA for 10 months experienced improvement in their symptoms when compared to children who took a placebo. Considering the anti-inflammatory characteristics of omega-3s, it is possible that omega-3 fatty acids could help treat a number of related immune conditions.

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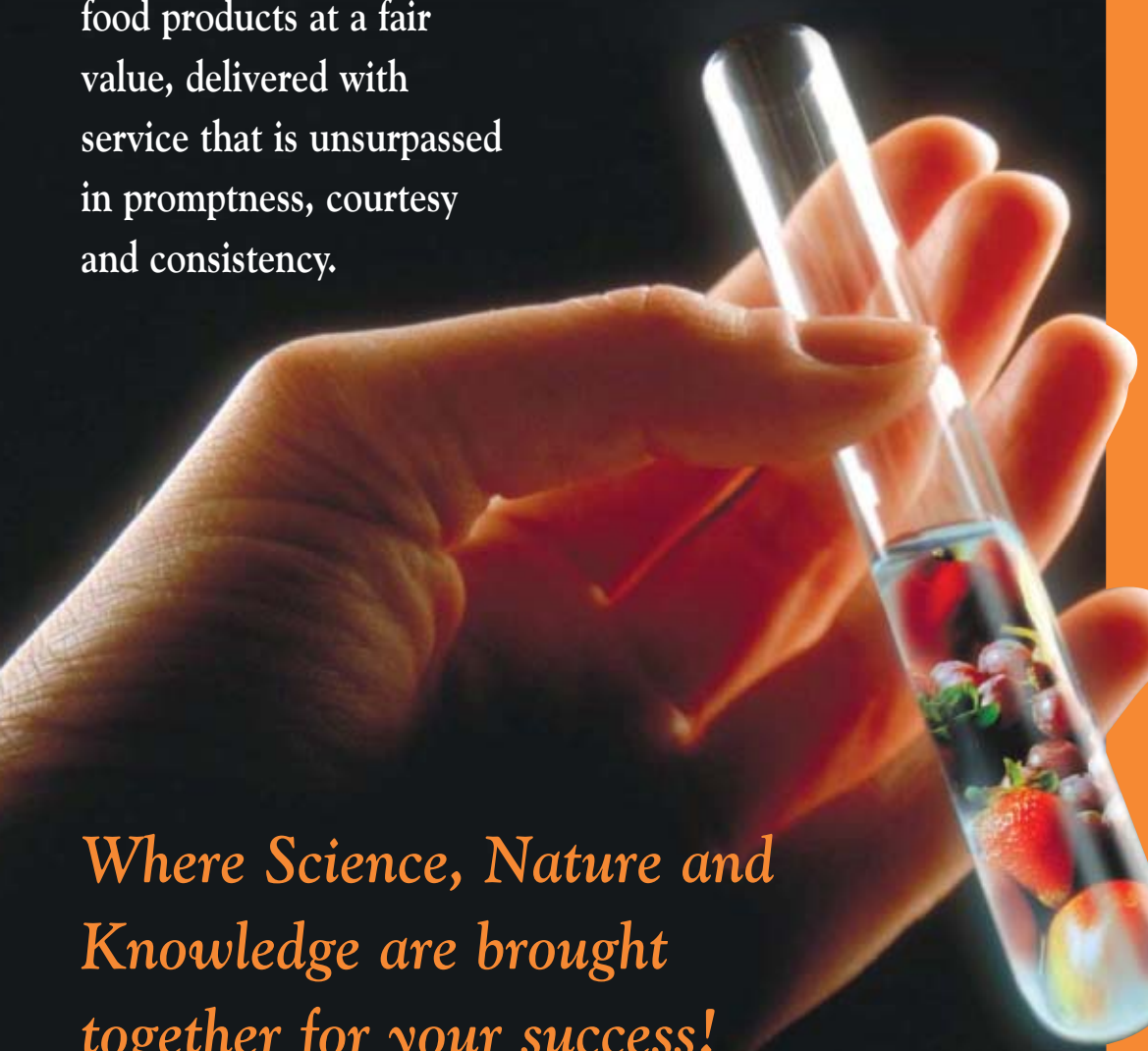

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Mintel reports that more that 1,000 products that contained omega-3s were launched globally last year, with most of them in the dairy, bakery and processed meat and fish categories. New product launches with omega-3 have increased each year, due to widening consumer knowledge and acceptance of its benefits.

There was a time when the fishy taste associated with fish oil prevented consumer acceptance of products incorporating omega-3s. However, today's technology allows many foods to utilize the benefits of omega-3s with no flavor or odor issues. One supplier uses a "double shell protection" for the omega-3 ingredients, "producing a free-flowing, dry powder with a unique molecular construction that locks in the health benefits and locks out even the slightest hint of fishiness," according to company literature.

Foods incorporating omega-3 fatty acids now include milks, yogurts, juices, bread products, pizza, waffles, tortillas and many other new products which seem to be jumping onto store shelves as we speak. Omega-3s are one of the top functional foods ingredients of 2007. PF

Website Resources:

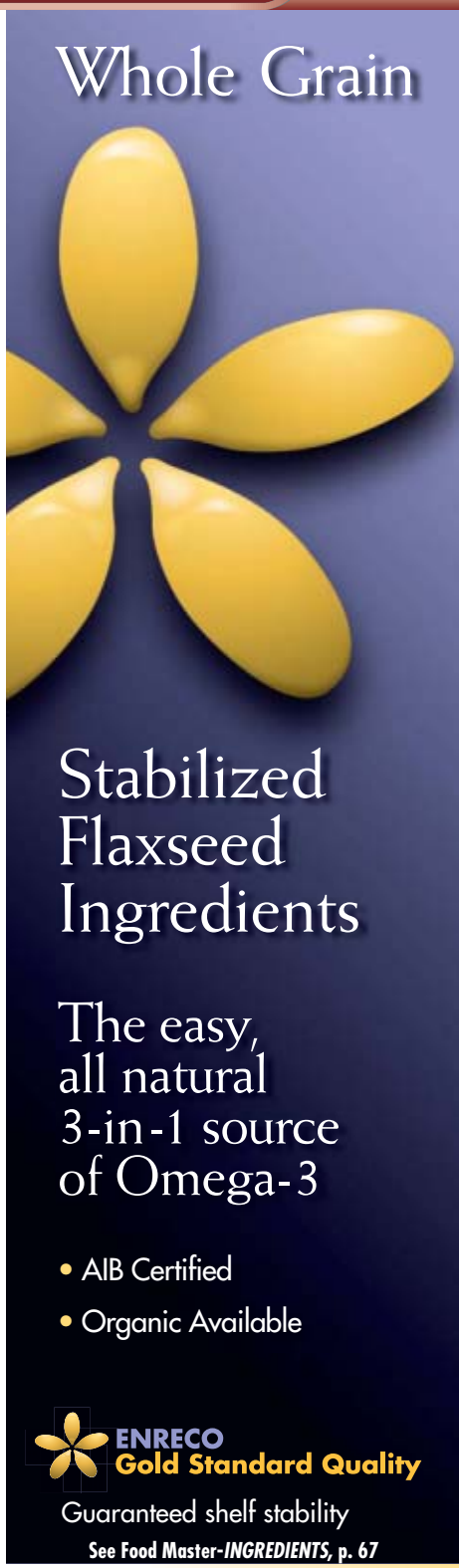
www.innovatewithdairy.com — Information on dairy products and probiotics

www.dairyreporter.com/news/printNewsBis.asp?id=78486 — Article about new products containing omega-3s

www.umm.edu/altmed/articles/omega-3-000316.htm — Information on omega-3 fatty acid health benefits

www.oceanspray.com/health — References and information on cranberry health benefits

www.chr-hansen.com/probiotics.html — Technical information on probiotics



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Dietary Fiber's State of Confusion

Consumers know it is important. They have a general understanding of how it works. Now, if they could only learn what it is. A focus on the meaning of prebiotics, digestible and indigestible carbohydrates and crude, total, insoluble and soluble dietary fiber may help in the quest for "fiber knowledge."

Daniel Best, Contributing Editor

PHOTO COURTESY OF ORAFTI

Everyone needs dietary fiber; without it, people would die—prematurely. Humanity has been aware of dietary fiber's health benefits for thousands of years; it seems to be the carbohydrate that cannot be named.

With consumers still vague about its benefits, scientists and regulatory bodies wrestle over its meaning in debates marked by acrimony and politics. For food product developers, this means confusion. That is unfortunate, because much is at stake, both in terms of public health and the food industry's ability to provide dietary fiber to consumers in safe, practical and cost-effective ways.

What follows is a summary of dietary fiber's definition and recognition as an essential food ingredient today.

In the End

Humans owe a good part of their health to large colonies of digestive bacteria that cheerfully and symbiotically inhabit the lower intestines. This bacteria is known as "probiotic." "Pro" is the positive prefix that connotes how these prolific bacterial colonies produce nutrients essential to continued health. Some microbes are more probiotic than others, so they are added to yogurts and supplements.

Probiotic bacteria are tasked with the final stages of gastrointestinal (GI) digestion, processing the most-difficult-to-digest food components into molecules that provide numerous benefits. These benefits include vitamins (such as vitamin K) and short-chain fatty acids (SCFAs) such as butyrate. A significant body of research indicates that butyrate promotes tissue repair, improves serum lipid profiles and possibly protects against certain cancers. It is likely that many additional nutraceutical and nutritional benefits of probiotic activity will come to light in time.

In order to contribute to our health, probiotic bacteria itself need food that is able to negotiate the human digestive system. Prebiotic dietary fibers meet this requirement.

To be healthy, active and productive, probiotic bacteria need food, and dietary fiber fits that need. This bacteria food must be able to negotiate the acid-hydrolytic, absorptive and enzymatic hazards of the GI system. Along the way, dietary fiber contributes additional nutritional and physical benefits in the form of laxation and the mediation of GI absorption of both nutrients and toxins. This probiotic food is known as "prebiotic."

Virtually all dietary fiber derives from the cell walls of plant materials (chitin, from shellfish, and fungi are exceptions), especially seeds. This provides a compelling argument for consuming brans and whole seeds (grains).

All dietary fibers are prebiotic, but some fibers are more prebiotic than others. Soluble dietary fibers, for example,

tend to be highly prebiotic. So, what does all this have to do with food ingredients and labeling?

A Glossary of Dietary Fiber

Like "whole grains," the definition of dietary fiber is a contentious work-in-progress involving competing interest groups (see sidebar). It is important, because the U.S. National Academy of Science (NAS) has established essential nutrient Daily Reference Intakes (DRIs) for "total fiber" ranging between 21g/day for women (51 years and up) and 38g/day for men aged 19 to 50. Mostly, American consumers ingest only a small portion of the DRI for fiber, so the pressure is on food companies to find innovative ways to increase dietary fiber consumption.

If only all could agree on what is meant by "total dietary fiber." Part of the confusion stems from the divergent needs of food scientists, food analysts and nutritionists. Like the three blind men describing an elephant, one group emphasizes the physical and chemical behaviors of dietary fiber in foods; the second is fixated on its measurement; and the third sees only nutritional benefits. Consequently, current definitions are replete with exceptions, omissions and contradictions.

■ **Carbohydrates:** Food carbohydrates are composed of five- and/or six-carbon sugars and combinations thereof. Single sugar molecules (saccharides) are called "simple carbohydrates" and are digestible. Digestibility depends upon whether the human system can cleave the bonds in linked saccharides or complex polysaccharides to release sugar molecules to be absorbed into the bloodstream. Most disaccharides are digestible. Many oligosaccharides (3-9 saccharides in length) are not. Polysaccharides may or may not be, depending upon the type of linkage (α or β) between the sugars and whether those linkages are susceptible to enzyme activity. If not susceptible to enzyme activity, it could be argued that they represent "dietary fiber." Not all agree.

■ **Digestible Carbohydrates:** Also referred to as "available carbohydrates," this refers to those carbohydrates that are fully digested in the upper regions of the gastrointestinal tract into sugars—ergo energy. Digestible carbohydrates contribute their full energy value of 4Kcal/g. We call the most recognizable complex digestible carbohydrates "starches."

■ **Indigestible Carbohydrates:** This gets closer to a definition for "fiber." These carbohydrates pass into the colon largely intact. However, this term is not quite correct, as many of these "indigestible carbohydrates" are often

Storm Clouds on the Horizon

Progress in dietary fiber definition trends moves by lurches, rather than leaps. No definition thus far appears to be wholly satisfactory. Debate rages on how to address non-plant fibers (chitin), purified vs. whole food dietary fibers, sugar alcohols, resistant starches and more. However, one recent development, if not countered, poses a real threat to the food and nutritional products industries.

Here is an earlier definition agreed upon by the American Association of Cereal Chemists (now AACC International) in 2001:

"Dietary fiber is the edible part of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine. Dietary fiber includes polysaccharides, oligosaccharides, lignin and associated plant substances. Dietary fibers promote beneficial physiological effects, include laxation, and/or blood cholesterol attenuation, and/or blood glucose attenuation."

Is this a food, analytical or nutrition-focused definition? Note the passing reference to "associated plant substances" and the omission of nutritional benefits associated with SCFAs.

A year later, the U.S. Food and Nutrition Board of the National Academy of Sciences (FNB/NAS) published another definition:

"Dietary fiber consists of non-digestible carbohydrates and lignin that are intrinsic and intact in plants. Functional fiber consists of isolated, non-digestible carbohydrates and lignin that have beneficial physiological effects in humans. Total fiber is the sum of dietary fiber and functional fiber."

Except, as noted, virtually all dietary fibers are at least partially digestible, with important implications for both human health and caloric value. Moreover, this definition helps neither food analysts nor product developers very much in quantifying the dietary fiber content of foods. It does, however, make an important distinction between "intrinsic" fibers and "isolated" fibers. With this in mind, note the following:

In the May-June issue of *Cereal Foods World*, a publication of the AACC International, noted cereal scientist Dennis Gordon alerted the industry to a recent, unilateral initiative by the United Nations FAO/WHO to further restrict the definition of dietary fiber to "intrinsic plant cell wall polysaccharides."

According to Gordon, this definition would remove any purified or modified dietary fiber ingredients from the "accepted" list of recognized dietary fiber ingredients in favor of "whole food" ingredients such as grains and vegetables.

Should this proposed, U.N.-endorsed definition be allowed to stand and affect international CODEX standards, the international food industry would face an enormous challenge. Countries that feel obligated to heed this standard for political reasons would close the door on many fiber-enhanced foods. Given the current challenges faced by companies in developing new, dietary fiber-enhanced products to address a recognized nutrient deficiency, the FAO/WHO proposal hardly bodes well for the health of either consumers or the food industry. On this issue, the food ingredient industry needs to be heard.

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A USDA technician, Diane Amundson, analyzes concentrates and forages for fiber. The quantity of fiber in a food depends, in part, on which analytical test is used to quantify it.

PHOTO COURTESY USDA / ARS BRUCE FRITZ

partially digested in the upper colon and further digested in the lower colon. Determination of their caloric value can be problematic.

This is because, in addition to partially releasing sugar molecules into the upper intestine, colonic bacteria further metabolize "indigestible" carbohydrates into short-chain fatty acids (SCFAs), which are absorbed into the bloodstream and contribute caloric value. Thus, it is not unusual to see caloric designations for these ingredients that range from 0 to 2.5Kcal/g.

■ **Crude Fiber:** Early agricultural scientists crudely defined fiber as indigestible roughage. It was measured as the residue from sequentially boiling plant matter in acid and alkali. Naturally, not much survives this abuse, so reported crude fiber values are very low. Crude fiber still occasionally appears in ingredient specifications and USDA Handbook composition charts, but it is pretty much obsolete for everything but livestock feeds.

Analytical techniques improved to distinguish between water-"soluble" and "insoluble" fiber—terms common today because they help elucidate a fiber's physical, chemical and nutritional properties.

■ **Insoluble Dietary Fiber:** The majority of dietary fiber in foods is insoluble—primarily cellulose, hemicellulose and lignin (although lignin is not, technically, a carbohydrate).

Insoluble dietary fiber is the residue left from subjecting carbohydrate materials to amylase digestion followed by a water-wash. Insoluble dietary fiber comprises the large majority (typically 75%) of the dietary fiber in most foods. It offers well-defined nutritional benefits and tends to have a very low water absorption capacity, unless further modified. It helps regulate transit times of foods through the upper intestine. Major food ingredient sources of insoluble dietary fiber include cellulose from wood, wheat stalk, oat hulls and corn bran.

In order to increase dietary fiber content of foods, an insoluble fiber is used, as insoluble fiber binds relatively little water and thus interferes less with the available water in food formulations. Insoluble fibers also tend to be less expensive. However, insoluble fibers can be modified to increase their water absorption capacity—either by physical treatment to increase capillary and colloidal activity or by chemical treatment to increase water solubility (e.g., cellulose gum).

■ **Soluble Dietary Fiber:** The water-soluble fractions, washed from the α-amylase-treated insoluble carbohydrate fractions, contain soluble dietary fibers. Most (not all) are precipitated from water with ethanol. One very major

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source of complication in dietary fiber analysis and definition is those remaining carbohydrate components not precipitated in ethanol, which require additional analysis.

Soluble dietary fibers are fibers that readily solubilize or form hydrocolloids in water. In sum, they are highly interactive with water, which provides interesting nutritional and nutraceutical benefits. Soluble dietary fibers include vegetable gums, β-glucans, inulin, oligosaccharides, pectins, polydextrose, resistant starches and dextrins, and chemically modified cellulose fibers.

Soluble dietary fibers, unless specially treated, tend to be major water hogs. Very low levels of use significantly affect available water, texture, thickness, gelling and flavor-release properties in foods. This can be good. Exceptions to this include resistant starches, resistant dextrins and hydrolyzed gums that have been treated to minimize their water absorption capacities.

■ **Total Dietary Fiber (TDF):** This is a useful but increasingly complicated term. It refers to the analytical sum of soluble and insoluble dietary fiber. This is the value that appears on food labels. However, to be accurate, scientists must be able to measure all soluble fiber components: insoluble fiber + soluble fiber = total dietary fiber.

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Part of the confusion regarding the definition of "total dietary fiber" is due to the divergent needs of food scientists, food analysts and nutritionists. One group focuses on its physical and chemical behaviors, another on its measurement and the third on nutritional benefits.

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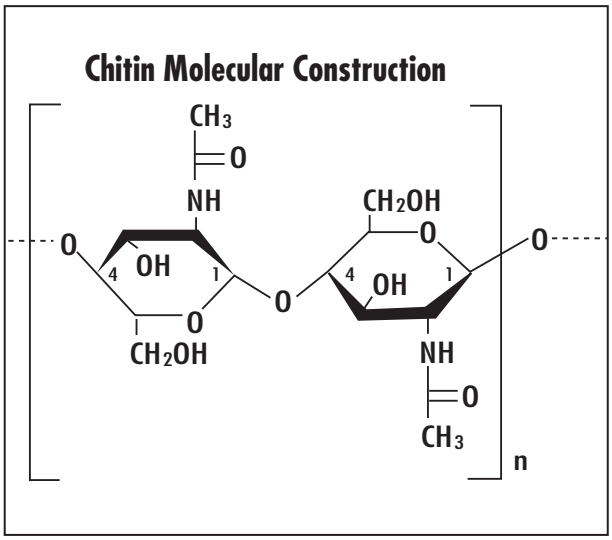

The problem with many fiber analyses is that they miss certain soluble fiber components. Consequently, very specific analyses are required to detect and quantify oligosaccharides and resistant starches. If a product contains sugar alcohols, they, too, behave as dietary fibers. If it is suspected that any of these components may be naturally or deliberately present in food or food ingredients, they must be specified for analysis.

> Not all fiber comes from plants. Chitin, which is found in shellfish among other sources, is comprised of glucosamine and acetylglucosamine, often in chains of several hundred units. The material is essentially a fiber.

Otherwise, the risk is a significant understating of the true dietary fiber content of the product.

The Caloric Conundrum

Finally, all dietary fiber contributes some dietary calories through partial upper-GI digestion or as short-chain fatty acids (SCFAs). This is confusing when calculating nutrition labels. Manufacturers can exclude insoluble fiber from the caloric count, but the FDA specifies that soluble fiber be assessed 4Kcal/g, unless otherwise documented. Sugar alcohols come with their own recommended caloric value, but what about resistant starches? Some resistant starches' contents vary according to processing conditions. A comprehensive dietary fiber definition will likely reference "digestibility," but what about caloric impact? Scientists still debate whether that counts or not.

Daniel Best is president of BEST VANTAGE Inc. and executive editor of Cereal Foods World.

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Keeping Up Appearances

Colorings and inclusions are key attractors in frozen desserts. The scientific principles of color are applicable for many foods. The nutritional impact of fruits, nuts and confectioneries in good-for-you desserts is something to consider, as well.

Steven Young, Ph.D., principal, Steven Young Worldwide

PHOTO COURTESY D.D. WILLIAMSON

As with all foods, the flavor of ice cream and other similar frozen desserts is influenced by all elements that affect taste (sweet, salty, bitter, sour, umami); texture (chew and smoothness); aroma (yes, ice cream smells); and appearance. Since nothing travels faster than light, we see ice cream before we actually taste it, thus, the importance of appearance to sensory appeal. Besides elements such as inclusions (particulates and variegating sauces), the color of ice cream itself can be of critical importance in overall acceptance or rejection of the finished food.

Ice cream does not really need added color. There are no standards or requirements related to the addition of color. Milk can provide all the background whiteness ice cream needs. This whiteness is not due to any color per se, but to the absence of color due to light reflecting off insoluble, ultra-small casein micelles and homogenized fat droplets. This ignores the contribution of a green-blue tint from the vitamin riboflavin. The number and size of insoluble particulates affect color perception. The more particulates there are, the smaller their size and the whiter the mix. The same is true if the mix is abused (overheated) in any way. In this case, the mix can darken due to browning. The composition of a mix also can contribute to non-enzymatic browning. When air (i.e., overrun) is added, ice cream lightens and whitens even further. So, composition and processing affect the color of ice cream mix—even without added color. In some instances, no color is added to ice cream. The resulting "color" of such "uncolored" ice cream can be pretty stark and not very appealing (or appropriate) for any given flavor.

Coloring can be of critical importance in overall acceptance or rejection of the finished food.

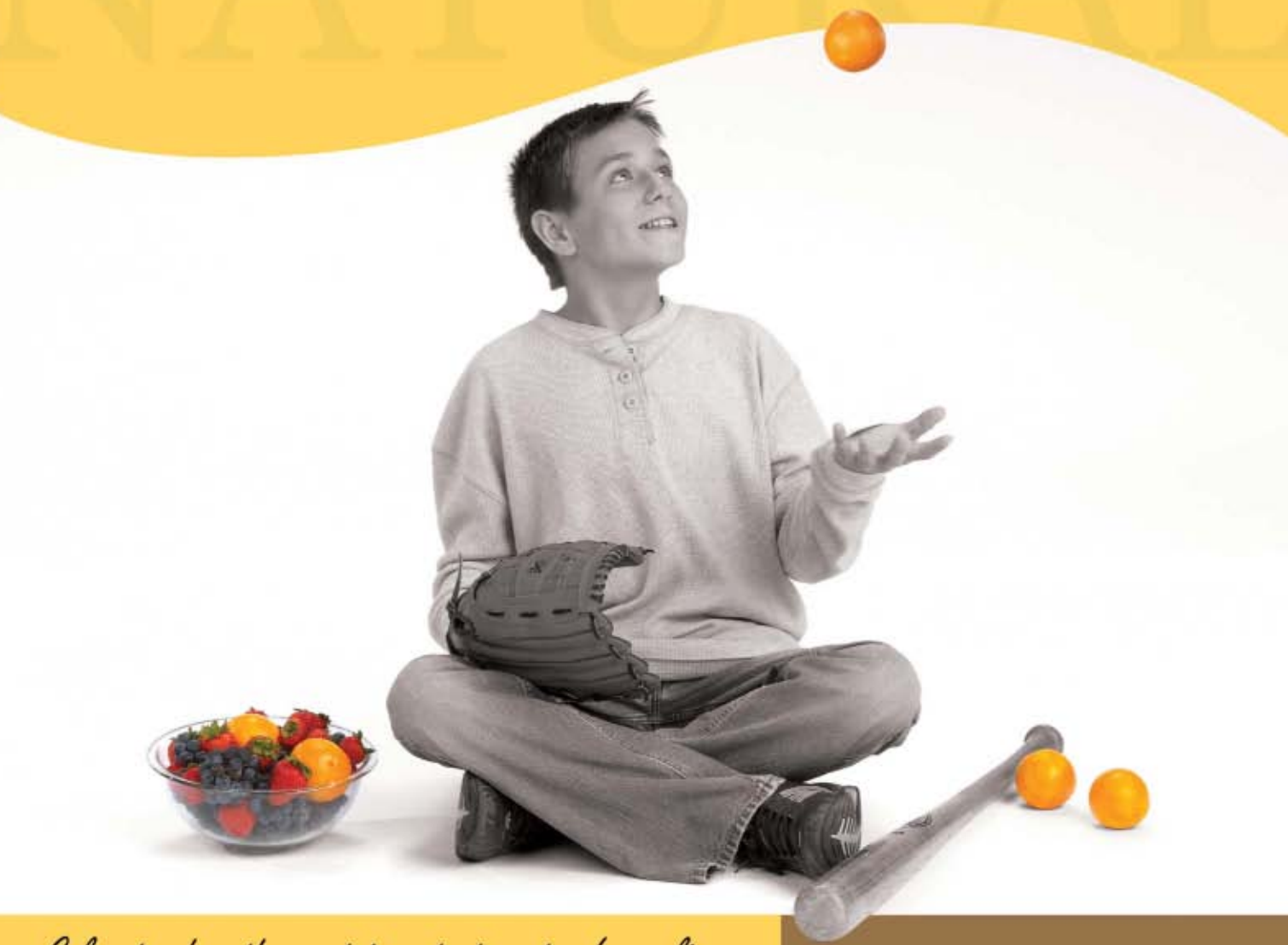
Color is added to ice cream to reflect the nature of added flavor and make product appearance match the desired sensory experience. Certainly, color should be compatible with whatever the declared flavor. From here a wide variety of coloring options exist.

Exempt and Non-exempt Colors

Exempt colors are the so-called "natural" colors. (There are no real "natural" colors, per se.) Exempt from regulation (other than GRAS status), these ingredients are typically declared as their common and usual names. Some examples of these include carrot oil, which produces a red-orange color; caramel color for golden yellow to dark brown; and annatto for orange-yellow coloring. (See chart "Exempt Colors.")

Developers should remember that cocoa powders also provide "natural" color to chocolate and similar flavors. Composition, processing, chemical history and use rate of any given cocoa powder is reflected in the ultimate color of, in this case, chocolate ice cream.

Note that colors from exempt ingredients often are related to purity, concentration, use rates, etc. and can be further affected by the chemical environment of ice cream mix (oxidation, microbiological growth, acid/base reactions,



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Exempt Colors

Fruit or vegetable juices	Colors vary with juice
Carrot oil	Red-orange
Paprika	Red-orange
Saffron	Orange-red
Beta-carotene	Yellow-golden
Annatto	Orange-yellow
Turmeric/Turmeric extract	Yellow-orange
Beet juice concentrate	Red-purple
Caramel color	Golden yellow-dark brown

Non-exempt Colors

FD&C Blue #1	Brilliant blue; turquoise blue
FD&C Blue #2	Royal blue
FD&C Green #3	Sea green
FD&C Red #40	Orange-red
FD&C Yellow #5	Lemon yellow

heat and light). Packaging forms (packaging materials, windowed lids, plastic pails, etc.) also affect color.

Non-exempt colors are those that are true additives and must be pre-approved by regulatory authorities before use in any food. Such colors include FD&C Blue #1, which produces a brilliant, turquoise blue or FD&C Green #3, which provides foods with a sea green hue. (See chart "Examples of Non-exempt Colors.")

Unlike many exempt materials, these non-exempt colors yield extremely precise and stable colors. However, under certain conditions of use, they too can lose color quite dramatically.

Other Considerations

Besides knowing how one or more colorants react in any given frozen dessert mix's shelflife, other considerations such as cost, allergenicity and kosher status need to be taken into account.

Some considerations are specific to ice cream. The background whiteness of ice cream affects the final color of the food, no matter what other colorant is added. Thus, it is important to know the potential interaction between the ice cream itself and any added color. Factors to consider include:

- Sensory appeal of the flavor to be made: There are many colors of vanilla ice cream. No one color or combination of colors really defines it. The color of ice cream depends on consumer preference in any given market. Offering distinct coloring is one of many ways to differentiate one ice cream from another, even within the same flavor category.
- Finished weights: The higher the overrun, the lighter the color of the base ice cream. Thus, the amount of color to add may be unusually higher than normal to accommodate the addition of air to the mix. Low overruns are dark; high overruns are light.
- Oxidation/Reduction potential: Under conditions where oxidation can occur, certain colors are apt to bleach-out.

Showcase: Inclusions and Coloring Ingredients

A line of lipid-based inclusions was created to impart sensory experience to a variety of baked good needs. SensoryEffects™ are **multi-component, custom-designed delivery systems that deliver flavor, aroma, color, texture and nutrition in a convenient, cost-effective way.** They help enhance existing products or help to create new ones. Because the technology platform is lipid-based, they can provide better sensory characters than carbohydrate- or protein-based inclusions, notes the supplier; they protect and deliver exactly what is necessary for a finished product. SensoryEffects, Tina Parsons, 800-957-3130, tinaparsons@sensoryeffects.com

Sometimes individual FD&C colors just do not accomplish the desired effect. Gold Coast Ingredients **specializes in blending diverse colorants (including FD&Cs, lakes, botanical extracts, organic extracts, caramel colors and beta-carotenoids)** to create the desired result and/or label declaration. Color changes, bleeding and fading are some of the problems faced whenever colors are used. Professionals working together can minimize these problems to achieve their goals. Free samples available. Gold Coast Ingredients, 800-352-8673, Michele Trent, info@goldcoastinc.com, www.goldcoastinc.com

Whether coloring dough or batter, natural color blends deliver a soft, pastel color to baked goods and can survive baking temperatures. colorMaker has created a series of powdered natural color blends for dough systems and a series of liquid natural color blends for batters. **These blends easily mix with the dough or batter to produce a soft, homogenous color that survives the internal temperatures associated with baking.** Recent examples include strawberry red muffins, banana yellow breads and pumpkin orange cookies, providing innovative natural color blends that are compatible with clients' products, packaging and processing requirements. colorMaker Inc., Stephen Lauro, 714-572-0444, stephen@colormaker.com, www.colormaker.com

In need of a natural color solution? Look no further than Kalsec®. Whether yellow, orange or red, **a full line of pigment colors and blends is now available from vegetable sources to help achieve the right hue, naturally.** Kalsec can also provide natural color solutions—including paprika and annatto—for use in organic foods (95%) and foods made with organic ingredients (70%). Kalsec, 800-323-9320, www.kalsec.com

This can occur at any time for a variety of reasons and can result in off-color, unnatural color or uneven color of the product.

■ Microbiological growth: Bacteria can affect the oxidation/reduction potential of any mix and become a source of color instability.

■ Heat: As noted before, heat can cause browning, but it also can accelerate oxidation reactions.

■ Light: In ice cream, light can be problematic in plastic packaging; in windowed, lidded containers; or even in ice cream exposed to dip-shop lighting conditions. Effects related to flavor also must be understood.

■ Packaging: How a given color reacts with or is compatible with packaging design and materials is also critical to color stability.

Defects

Sometimes, despite manufacturers' best efforts, ice cream still experiences major defects. They can be grouped into the following areas:

■ Wrong shade or color: The product is not really compatible with the declared flavor. Red is not a classical color for vanilla.

■ Unnatural: Perhaps the item is the right color, but the wrong shade or tone. Dark brown may not be compatible with milk chocolate.

■ Uneven: A blotchy, uneven, spotted appearance is simply not appealing.

■ Modification of applied color: Bleaching and oxidation can cause serious color changes. When red turns green, strawberry ice cream is not strawberry ice cream.

Delivering the right color (tone, shade, intensity, etc.) at the right time and under the right conditions helps promote the sensory appeal of the finished ice cream and lets consumers enjoy the rest of their sensory experience (smoothness, creaminess and flavor).

—Steve Young is a food consultant who can be reached at steve@stevenyoung.net, www.stevenyoung.net.

Good-for-You Considerations

The following section was first published under the title of "Inclusions in Good-for-You Frozen Desserts" in the May 2005 issue of Dairy Foods *magazine. It was written by Steven Young, Ph.D. and Bruce Tharp, Ph.D.*

Key considerations when formulating "good-for-you" ice cream are what you wish to accomplish and what you

Showcase: continued

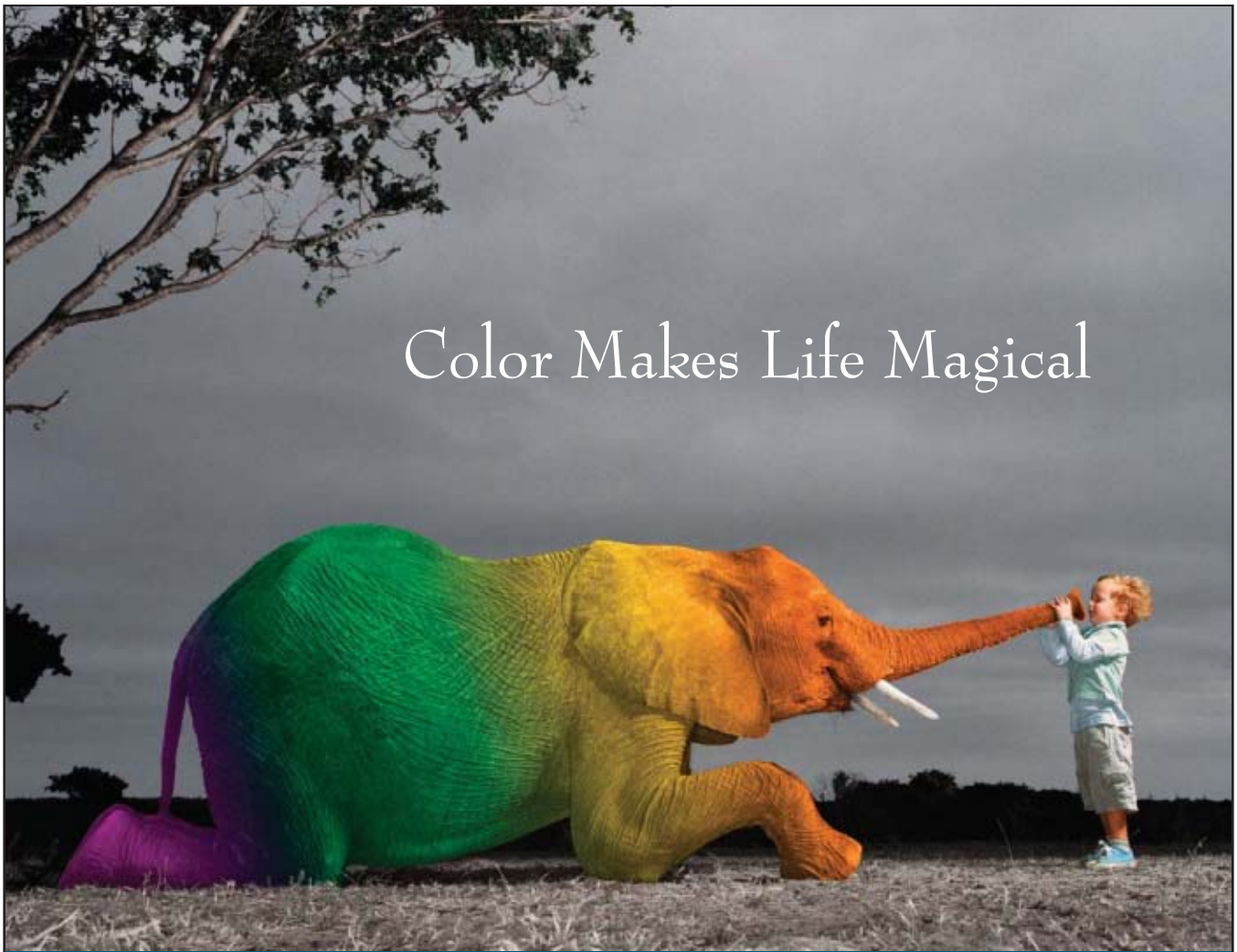
A new range of colorants combines anthocyanins from different sources to obtain specific shades and/or improved stability to low-pH food applications. The Chr. Hansen ColorFruit™ formulation of blends **utilizes proprietary technology to optimize the intermolecular interactions of key anthocyanin molecules, resulting in enhanced stability for many applications,** including beverages, fruit preparations and confectionery. ColorFruit's shade range varies from violet to red to yellow-red. Chr. Hansen Inc., Erin O'Harrow, 414-607-5779, useho@chr-hansen.com

Now there are two high-quality carotenoid colorants offered to the food and beverage industry. LycoRed Ltd. offers Tomat-O-Red®, derived from tomato lycopene and Lyc-O-Beta, a yellow-to-orange colorant from *Blakeslea trispora.* These colorants offer three important market advantages. **They are all-natural, 100% vegetarian and deliver antioxidant health benefits along with great color.** Tomat-O-Red and Lyc-O-Beta are stable under a wide range of temperatures and pH changes and come in two ready-to-use formulations that dissolve easily and provide homogeneous coloring. P.L.Thomas, LycoRed USA, 973-984-0900, ext. 214, plt@plthomas.com, www.plthomas.com

A caramel color from a leading manufacturer can be used to achieve food colors from light yellows to deep browns. Sethness' **caramel colors are available in both liquid and spray-dried powder specifications and are highly stable for application flexibility, versatility and economy.** The line includes GMO-free caramel colors as well as Certified Organic caramel colors. Used in virtually every segment of the food industry, Sethness' caramel color applications include beverages, baked goods, sauces, soups, cereals, dry mixes and pet foods. Sethness Products Company, 888-772-1880, mail@sethness.com, www.sethness.com

Looking for a natural source of orange color or vitamin A? DSM Nutritional Products now offers CaroCare® Natural Beta-Carotene 20% V free-flowing beadlets. The **beta-carotene is obtained by fermentation from *Blakeslea trispora* (fungal-derived) in a cornstarch coated matrix.** For typical beverage applications, a stock solution in warm water would be prepared. At 5 or 10ppm level, the color is perceptibly more orange than traditional 10% water-dispersible beta-carotene beadlets. This product is OU kosher-certified, allergen-free, animal-free and has vitamin A activity of 333,400 IU/gram. DSM Nutritional Products, Diane Hnat, 973-257-8675, Bill Brown, 973-257-8288, www.dsm.com

Color foods the natural way with 100% natural, pure dark-roasted barley ingredients. Black Malt Flour and Black Malt Extract from Briess add color to baked goods, gravies, dry blends and pet foods without adding flavor or enzymes. Black Barley Grits add eye appeal to seasoning blends, salsas, sauces and other foods. Use grits in small quantities for no flavor or at more than 5% for a hint of roasted flavor. Briess, Ann Heus, 920-849-7711, ann.heus@briess.com



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want to promote about the finished food. These are determined by balancing marketing and other business-related objectives with regulatory limitations and allowances. That is, when considering a specific "good-for-you" claim, consider finished weight (pounds per gallon) and compositional limitations amongst other objectives. Working backward from a target finished weight per serving can help fix levels of certain compositional factors such as total fat, total saturated fat, total sugar(s), total carbohydrates, calories, etc. Further, if nutritionally efficacious ingredients (i.e., "nutraceuticals") are to be added, their use rates need to be worked into the basic ice cream mix and be compatible with the predominance of scientific peer-reviewed literature for that specific nutrient or ingredient and the physical performance needs of the mix.

Nutrient content targets are critical when considering nutrient content claims. They are also critical when health claims (implied, expressed or qualified claims that couple ingestion of a nutrient with a specific disease) or structure/function claims (claims that "help maintain good health") are desired. Health claims are strictly regulated and often require one or more nutrient content claims or targets and general dietary restrictions to apply the claim. Structure/function claims are less restrictive, but require sound scientific principles and evidence to support the eventual claim. As always, seek the counsel of appropriate scientific and regulatory authorities when considering product claims of any type.

Other factors also need to be taken into account. Flavors and flavorings can add significant amounts of total fat, sugars, etc. The addition of particulate and variegated inclusions can make or break any nutrient content target and, thus, any claim being sought. Economics become important, as any given "good-for-you" ice cream may, or may not, meet financial objectives of the business. Direct or indirect claims, such as "natural" or "'organic," can also affect what can or cannot be done.

Do not forget manufacturing limitations in the plant. These can include the logistic effects of introducing new mixes with regard to production scheduling, mix storage space, and equipment operation and performance. One must also consider the need to deal with high levels of dry ingredients, such as the bases often used in the production of sugar-modified products, and/or the use of small containers of liquid ingredients such as polyols. Mix and ice cream flow and fill, as well as machinability at the freezer and management of multiple freezer options, should also be considered (e.g., sorbet swirled into ice cream or frozen yogurt to achieve specific nutrient content targets).

The impact of composition modifications on shelflife is also critical, particularly if the modified product will be

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exposed to more stressful distribution temperature conditions. "Good-for-you" compositional changes can significantly change the heat-shock resistance of any ice cream through effects on the dynamics of ice melting and recrystallization. This can be dealt with by knowing the specific rigors of market distribution, then engineering appropriate heat shock protection into the formulation process. The very best way to manage this is to compare the freezing profile of candidate compositions with each other and with those of current or known finished products. This will help assess compatibility with the operational and distribution needs of the product and provide a good sense of ultimate heat shock resistance and success.

Here, we have discussed a few general aspects of what needs to be taken into account when formulating ice creams that address certain consumer health concerns. In many respects, developing specific compositions can follow the same guidelines that apply to standard ice creams, such as those involving total solids, fat/SNF balances, sweetness, water immobilization needs, etc. More information about specific considerations is archived in Tharp & Young On Ice Cream columns at www.onicecream.com, including formulation of ice cream modified relative to fat (reduced, low and fat-free); carbohydrate (lactose-free, no sugar added, sugar-free, low carbohydrate and low glycemic index); and other nutrition-related "hot topics." pf

For more detail on formulating "good-for-you" ice creams, including use of mix freezing profiles, join Dr. Bruce Tharp and Dr. Steven Young at a "Tharp & Young on Ice Cream" technical short course, workshop and clinic to be held December 5-7, 2007, in Las Vegas, Nev. The fully updated and revised program and registration is available at www.onicecream.com, or call 610-975-4424 or 281-596-9603. Tharp & Young also offer custom, on-site training programs to cover specific needs held at mutually acceptable locations and times.

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Challenged R&D

In building a new product matrix, R&D must address consumers' interest in health, product safety and sensory quality. *Prepared Foods*' 2006 Applications Seminar addressed the issue of water activity and the impact of omega-3s, mineral phosphates, resistant starch and colorants on a food's healthiness and appearance.

PHOTO COURTESY OF NOVO-NORDISK

Omega-3s in Functional Foods

Some fats, such as omega-3s, provide solid health benefits. In fact, the FDA allows a qualified health claim stating: "Supportive but not conclusive research shows that the consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. One serving of (name of food) provides (x) grams of EPA and DHA omega-3 fatty acids." While most Americans are unable to or do not wish to consume the recommended two servings of oily fish per week, it is possible to obtain the benefits of eating fish by supplementing the diet with omega-3-rich fish oils.

The primary long chain omega-3 fatty acids found in fish oils are EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). EPA has been shown to decrease platelet aggregation, promote vasodilatation, inhibit inflammatory response and reduce the occurrence of secondary heart attacks. DHA helps brain and retina development, minimizes depression, improves immune response and enhances cognitive functions. These conclusions are the results of almost 30 years of work that has encompassed several thousand studies, including well over a thousand clinical trials. Both EPA and DHA are found in one company's refined menhaden oil. The product is odorless and bland-tasting and has been directly approved by the FDA as a GRAS food ingredient. It has the added advantages of being non-hydrogenated, non-GMO and is certified kosher.

Care must be exercised when handling any highly unsaturated oil such as omega-3 fish oil. The oil can be refrigerated for short periods of time, but

A number of societies and agencies around the world recommend levels of omega-3 fatty acid consumption.

Daily Recommended Values for Omega-3s

■ American Heart Association (CHD)	1.0-4.0g/day
■ British Nutrition Foundation	1.0-2.0g/day
■ German Nutrition Society	1.0-1.5g/day
■ Health & Welfare Canada	1.0-1.8g/day
■ ISSFAL (Intl. Soc. for the Study of Fatty Acids & Lipids)	650mg/day
■ Council for Responsible Nutrition	500mg/day
■ Ministry of Health—Sweden/Finland	1.0-2.0g/day
■ National Nutrition Council—Norway	1.0-2.0g/day
■ NATO workshop on n-3/n-6 fatty acids	0.8g/day

Source: OmegaPure

www.PreparedFoods.com / rd

In this study, the best fiber source had to have the desired characteristics, including yielding a clear product with acceptable viscosity. The fiber chosen, resistant dextrin, is shown on the left.

Clarity and Color of Selected Soluble Fibers
(10% Solutions)

Resistant dextrin | Inulin | Polydextrose | Resistant maltodextrin

Source: National Starch Food Innovation

the oil should be stored frozen for extended periods. After opening, the oil should be used immediately. Omega-3s should be added as close to the end of the process as possible. One key step in formulating with long chain omega-3 fish oils is, regardless of application, to first blend the oil with any other existing fat in the formula. It is also important to remember to keep the percentage of fat in the formula the same; the fish oil will replace a small amount of the existing oil in the formula. Fish oil can withstand most processing parameters, including but not limited to: baking times and temperatures, pasteurization, homogenization and shear. The menhaden oil may also be formulated with antioxidant systems, such as mixed tocopherols and tertiary butyl hydroquinone (TBHQ), which will enhance stability in storage as well as in final products. Chelating agents and additional antioxidants may also be added during ingredient addition, which will further minimize the potential for oxidation.

Fish oils containing omega-3 fatty acids perform best in refrigerated and frozen foods, products with a short shelflife and packaged foods. Application examples include salad dressings, spreads, tortillas, baked goods, ice cream, nutritional bars and yogurts.

"Omega-3s in Functional Foods," Valerie Sanders, food applications scientist, OmegaPure, vsanders@omegapure.com, www.omegapure.com
—Summary by Richard F. Stier, Contributing Editor

Fiber in Beverages

This presentation describes a case study in which a beverage product is formulated using soluble fiber. The target product was to be a clear beverage that was shelf-stable and healthy and was clearly differentiated in the marketplace.

The fiber source had to be soluble, easily dispersible, yield a clear product with acceptable viscosity and hit the target flavor profiles for sweetness. Color also played a role, as it could affect clarity (see graphic "Clarity and Color of Selected Soluble Fibers").

The soluble fiber had to have a low molecular weight, be refined and be a concentrated source of fiber. This reduced the choices to digestive-resistant dextrin, polydextrose, inulin and resistant maltodextrin. After evaluating viscosity and color, the developers in this study decided that the best product to use would be resistant dextrin. This ingredient has low viscosity, is transparent in solution, is highly soluble, disperses easily and has low sweetness and low hygroscopicity. Resistant dextrin is also heat-stable, pH-stable, resistant to shear and unaffected by bakery yeasts or dairy cultures; that is, they will not ferment the product. Furthermore, the ingredient has 85% dietary fiber, excellent digestive tolerance, a low glycemic response, reduced insulin response, is sugar-free, low-calorie (only 2Kcal/g) and is a non-GMO product. As a prebiotic fiber, 75% of the product is fermented slowly in the large intestine.

When employed in processed products, resistant dextrin allows food product developers to remove part or all of the sugar, allowing label claims such as reduced-calorie, no-sugar-added or sugar-free. The ingredient provides mouthfeel and body and acts as a bulking agent. It also balances the flavor profile of high-intensity sweeteners. The addition of resistant dextrin in beverages at approximately 1.3% and 2.8% allows label claims of "good source of fiber" and "high source of fiber," respectively. The manufacturer recommends the dextrin be used at 10g to 20g per liter when the goal is reduced- or sugar-free products. Although the focus of this presentation was a clear beverage, resistant dextrin may be used in dairy products, soups, sauces, bakery fillings, pasta, baked goods, meat products, savory dips and snacks.

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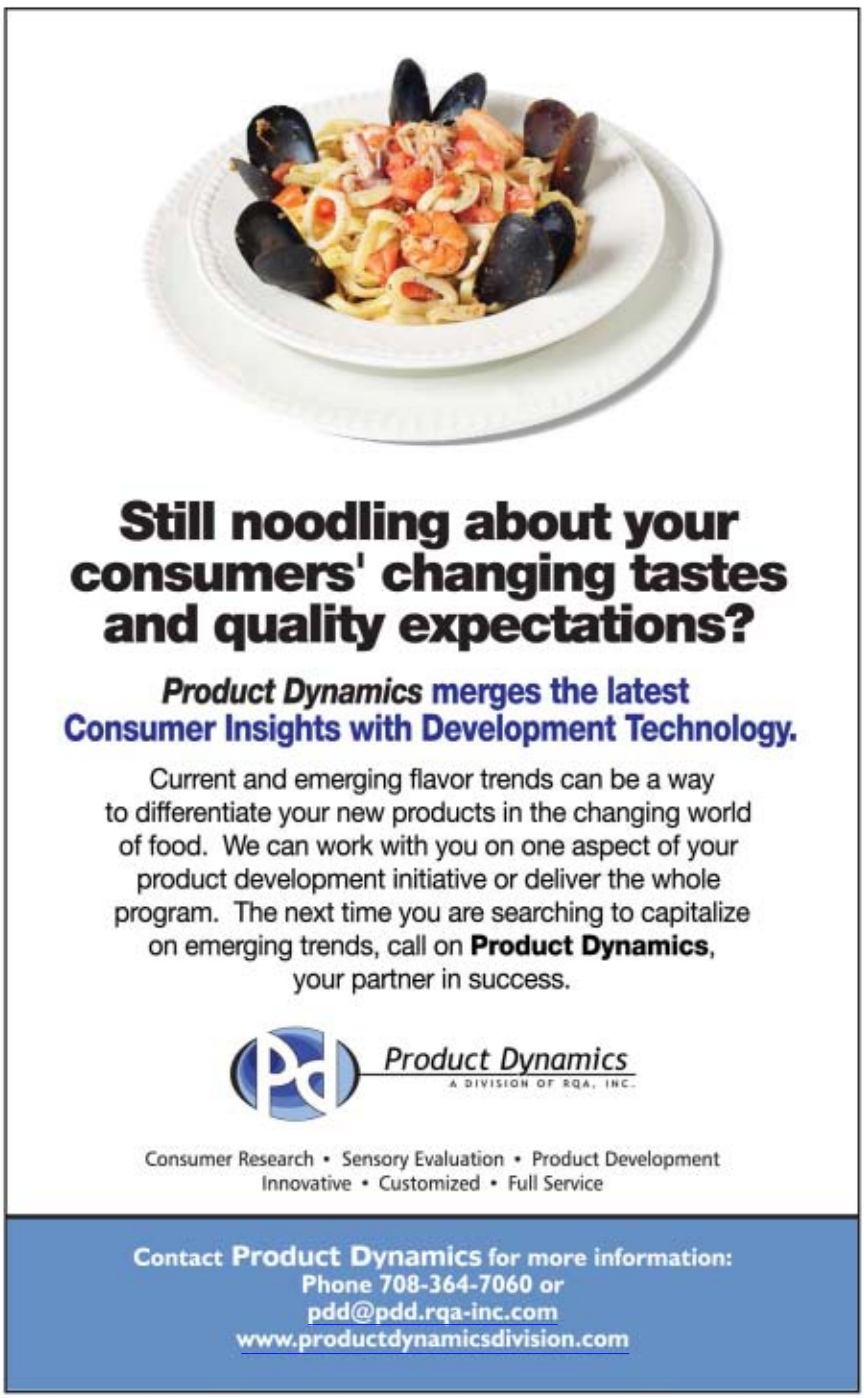
"Formulating with Soluble Fiber: Functional and Nutritional Benefits," Wendy Dalidowicz, senior technical service engineer, National Starch Food Innovation, wendy.dalidowicz@nstarch.com, www.nationalstarch.com
—Summary by Richard F. Stier, Contributing Editor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Describing Water Activity

Water activity (A_w) is a measure of the energy status of the water in a system. It is defined as the vapor pressure of water above a sample over the vapor pressure of pure water at the same temperature. As water activity decreases, or as water becomes more "bound," the water in a system is less available for microbiological and chemical reactions, which can impart stability to a food system. Factors that affect water activity are solute interactions, surface interactions and capillary effects.

Instruments and methods used for measuring water activity include hair or polymer hygrometers, freezing point depression, isopiestic equilibration, electronic hygrometers, chilled mirror dew point sensors and near infrared prediction.

Since water activity is temperature-dependent, temperature should be reported with each water activity measurement. Changes in temperature will affect water activity differently for each product type, which can lead to moisture migration in a multi-component product if the temperature dependence of the water activity of the two components is not the same. Temperature affects water activity due to changes in

water binding, dissociation of water, solubility of solutes in the water and the state of the matrix.

When measuring water activity, care must be taken to collect enough samples to ensure that the water in the sample will equilibrate with the vapor phase and that the sample will not pick up or lose moisture from the instrument chamber. There are some products that may require special sample preparation. These include emulsions (both water-in-oil and oil-in-water emulsions), coated samples and those with certain volatiles such as ethanol or propylene glycol. Water activity meters generally provide analysts with answers in less than five minutes.

When conducting a moisture analysis for a food product, the analysis should include both moisture content and water activity. Determining water activity using any one of the many meters is, however, more rapid and less complicated than determining percent moisture. Water activity is needed for safety and quality, while moisture content is need for labeling and texture. Water activity, not moisture content, provides information about how water will move in the food system, as water will migrate from areas of high water activity to areas of low water activity. The relationship between water activity and moisture content is called the moisture sorption isotherm. Each product has its own moisture sorption isotherm, which is a function of the different interactions between the water and solid components of the food at different moisture contents.

Water activity, as part of a complete moisture analysis, provides valuable information about product safety and quality and is central to formulating new, naturally preserved products

"What is Water Activity?" Brady Carter, applications engineer, Decagon Devices Inc., brady@decagon.com, www.decagon.com
—Summary by Richard F. Stier, Contributing Editor

Natural Reds in Beverage Systems

Color is an important element when it comes to how foods are accepted by consumers. The food developer must also select a system that will maintain its color during processing and distribution.

With increasing consumer interest in natural foods, there has been a significant demand for stable natural colors. Companies such as Whole Foods, Trader Joe's and Wal-Mart (on the horizon) have fueled this trend. The trick is taking those colors and ensuring that they have the stability to perform in food systems. There are many fruits and vegetables currently being used for color—products which deliver a wide range of colors (see chart "Red Colorants from Fruits and Vegetables"). These include grapes, pump-

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See Food Master-*INGREDIENTS*, p. 169

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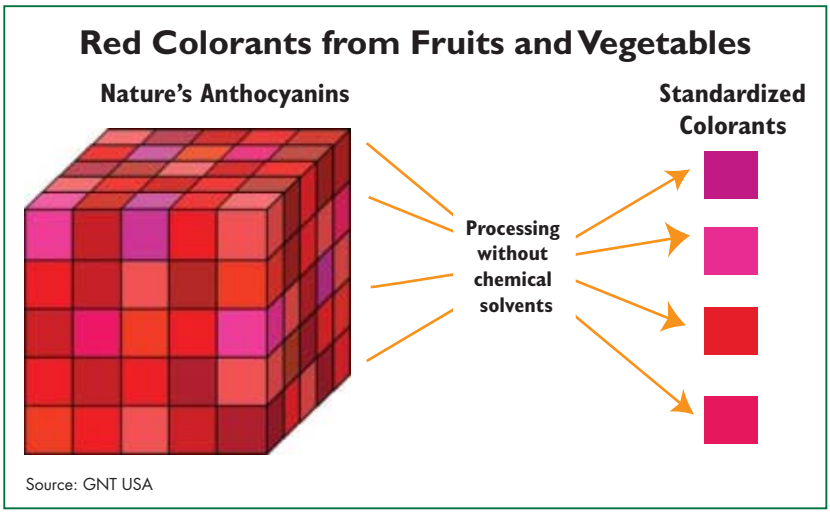

A plethora of colorants from fruits and vegetables helps deliver a wide variety of coloring solutions for mainstream products.

kins, elderberries, red cabbage, tomatoes and carrots. One benefit from using such colors is that the red pigments, or anthocyanins, contain phenolic compounds that have potential health benefits.

When developing products using colors, there is a stepwise progression that should be followed. The first step is to determine what color goes with the marketing strategy. Once this is done, developers need to consider how the color will be delivered (powder or liquid), what packaging system will be employed and what kind of shelflife the end product should have. Glass bottles will expose colors to light, whereas plastics may be permeable to oxygen. During the development process, it is important to understand the color of the base material. It is also important to understand the functional aspects of the system, such as pH, and whether there is a potential for ingredient interactions.

Like it or not, shelflife studies of new formulations must be an essential element of the development process. These studies will allow the developer to determine the stability of the color in their products. If possible, accelerated studies may be done, assuming that these accurately predict what happens during normal distribution and storage.

The color supplier should be considered a partner and can serve as a resource during the development process. The supplier may also be able to develop customized products for specialized applications. This, however, is only one element that should be considered when selecting a color supplier. Other concerns are providing users with consistent products as required for production, offering fair and consistent pricing and giving services as needed. The word "partner" is the key. PF

"Natural Red Colorants in a Variety of Beverage Systems," Stefan Hake, CEO, GNT USA, shake@gntusa.com, www.gntusa.com
—Summary by Richard F. Stier, Contributing Editor

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Questions?
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Sweetness Interactions

Richard F. Stier, Contributing Editor

Sweetness is not only a basic taste; it is also a characteristic that makes food desirable. All sweeteners, including both nutritive and artificial products, use sucrose as the standard when measuring overall sweetness. However, is sucrose the ideal sweetener?

Researchers at Takasago International Corporation have utilized basic and applied sweetener research to develop core competencies within the company and to better understand the complexities of flavor and sweetness interactions. "The ultimate goal of this work is to create better products for use in the beverage industry and beyond," noted Jennifer B. Mei, Ph.D., sensate flavor chemist at the company, in her presentation "Masking Artificial Sweeteners in Beverage Applications," given at the 2007 *Prepared Foods*' R&D Applications Seminar.

"Our research includes working with nutritive sweeteners such as sucrose, plus the five low-calorie, non-nutritive sweeteners currently approved for use in the U.S.," Mei adds. These five products include sucralose, saccharin, neotame, aspartame and acesulfame potassium (ace-K). Each of these products has different descriptive sensory profiles. (See chart "Sweeteners' Sensory Profiles.")

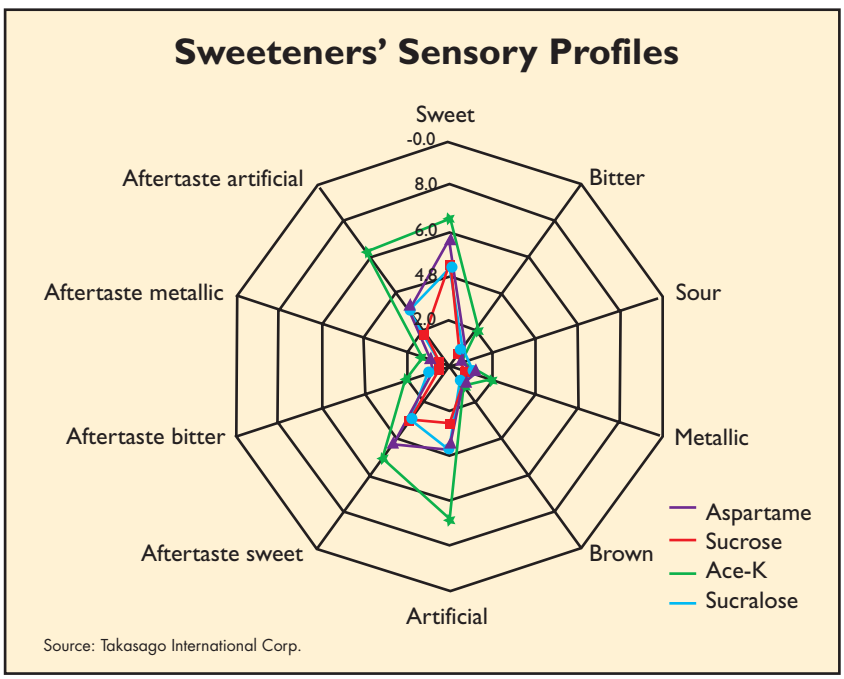
Takasago has a test panel consisting of 16 people who have been highly trained in taste, aftertaste, mouthfeel and body attributes of sweeteners. Using this panel, the company is seeking to develop sweet flavors that will provide users with a balance of sweetness, minimal bitterness, good mouthfeel and other desirable sensory properties. Many of these characteristics are used to mask bitterness, which can be a concern with non-nutritive sweeteners. The end result of this work is Takasago's Intensates®. Utilizing these materials in various combinations and permutations can block and mask bitterness. These masking sweeteners have, however, been found to be quite effective in a number of different applications including vitamin water, diet iced teas and diet juice drinks.

For example, a vitamin water formulated with berry flavor plus an Intensate flavor at 0.10% yields a beverage that not only masks the sweetener, but also the vitamins and minerals included in these products. "Such products are normally manufactured with the flavor, plus sucralose and acesulfame potassium. With the diet iced tea, another Intensate product at 0.03% masks sweetness and preservatives," noted Mei. There is, however, no one ingredient or combination that will work on all types of bitterness. With this understanding, Takasago aims to work with each customer to find the optimum solution.

The company has been actively developing proprietary products to mask various off-flavors in beverage systems. Takasago's Intensate products can be used in beverages and many other applications. Processors looking to enhance the overall flavor, mouthfeel and acceptance of new or existing products may wish to consider these ingredients. In addition, Takasago's trained panel of experts helps potential users find the best application to meet their needs. Pf

For more information:
Takasago International Corp. • Rockleigh, N.J.
Jennifer B. Mei • 201-767-9001
Jmei@takasago.com • www.takasago.com

The sensory profiles of four different sweeteners in tasting solution, as determined by descriptive sensory analysis.



One Ingredient/Many Uses

Elizabeth Mannie, Contributing Editor

An enzyme-based ingredient for cakes has recently enjoyed huge interest among manufacturers because of its ability to solve a variety of formulation or manufacturing issues. José Mastenbroek, new business developer of baking, DSM Food Specialties—Netherlands, explains, "This ingredient can aid in improving nutritional quality, reducing egg content and enhancing softness and shelflife, as well as reducing cost."

CakeZyme™ is an enzyme that hydrolyzes lipids (emulsifier-type molecules) into more functional so-called lyso-lipids, which are stronger emulsifiers. By incubating whole eggs or egg yolk with CakeZyme, the functionality of the eggs is upgraded in cake production. This means fewer eggs can be used, reducing cholesterol content of the cake. CakeZyme can also deliver a slight reduction in the product's fat content. However, it is not intended to fully replace fat. To achieve a significant fat reduction, but still deliver the right mouthfeel and buttery taste, CakeZyme can be used in combination with other ingredients.

Cake formulas are complicated systems. All ingredients in the formula need to be in the right balance to achieve the perfect cake.

Egg is added to cake formulas for emulsification properties (among other things). The active component in eggs for emulsification is egg lecithin. CakeZyme converts lecithin into lyso-lecithin, which is a stronger emulsifier. Because it is stronger, the amount of egg required can be reduced by up to 20%.

CakeZyme does not break down starch, but lyso-lecithin is able to complex with starch, thereby preventing it from recrystallizing. Recrystallization, or retrogradation, causes a hardening of the cake structure, contributing to staling. By using CakeZyme, a softer structure is obtained directly after cooling and also on the shelf. As a result, a four-week-old cake still tastes fresh.

Use Level

Cake formulas are complicated systems. All ingredients in the formula need to be in the right balance to achieve the perfect cake. That is why the optimum amount of CakeZyme varies according to the formula and product. It is not to be assumed that using a higher quantity of CakeZyme will necessarily lead to an even better quality cake.

CakeZyme enables formulators to realize up to a 20% egg reduction in a formula—typically resulting in a significant cost savings. The use level depends on the product type and recipe, but generally falls between 0.02% and 0.2% of the formula egg weight. The addition of CakeZyme significantly enhances emulsification, resulting in lower batter density, improved batter viscosity and delayed crumb setting. Consequently, the finished product will show increased volume, improved crumb structure and softness with a longer shelflife.

Other baked products containing eggs (if egg is used for emulsification) can, in principle, benefit from use of CakeZyme. Presently, experiments with CakeZyme are taking place with brioche and biscuits.

Labeling

According to DSM, CakeZyme can be considered a processing aid and, therefore, does not require labeling according to 21CFR 101.100.

One ingredient solving so many issues has the potential to be successful in helping a variety of manufacturers. pf

For more information:
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José Mastenbroek • +31 15 279 4001
info.bakingenzymes@dsm.com
www.dsm-bakingenzymes.com

Functional Cranberries

Elizabeth Mannie, Contributing Editor

"Antioxidants, in addition to the anti-adhesion effect on bacteria, are the reasons that cranberry consumption promotes urinary tract, dental, stomach and heart health," explains Kristen Girard, principal food scientist, Ocean Spray ITG. Evidence is also being found that the antioxidants found in cranberries can inhibit the growth of lung tumors, colon and leukemia cells (in vitro).

The cranberry is one healthy ingredient that food manufacturers can use confidently without sacrificing taste, texture or other quality properties that consumers demand. Cranberries are recognized for their appealing bright red color, tangy taste and versatility—in addition to their health benefits. Sweetened, dried cranberries come in a wide selection: "less sugar-high fiber," juice-infused, soft and moist, glycerated, diced or double-diced; and more. All enable manufacturers to choose the best format for their needs.

Often fruit inclusions can cause problems, including color and moisture bleed and loss of piece identity in applications such as breakfast cereals, cereal bars and baked goods. Ocean Spray ITG's BerryFusions™ Fruits, cranberry-based, process-tolerant fruit ingredients, retain their shape and color throughout manufacture without moisture loss in dry applications such as cereals.

These real fruit fusions act as fruit mimics that offer a clean label declaration. A cranberry is used as a carrier, infused to a desired sweetness, and then topically flavored with natural flavors or combined with juice concentrate. Available in blueberry, strawberry, raspberry, mango, orange and apple-cinnamon flavors, these cranberry-based ingredients are ideal for a wide range of baked goods.

BerryFusions Fruits are hardy, process-tolerant fruit pieces that offer manufacturing stability; retain their piece identity without suffering the water migration or color bleed common to most fruits; and keep their flavor and texture throughout processing and storage. They can be incorporated directly into a batter or dough with no need to pre-soak or pre-treat—with no risk of compromising end product consistency.

Other cranberry products offered by Ocean Spray include frozen cranberries, cranberry purée, concentrate and powder. Demand for cranberries has seen double-digit growth in recent years. News of cranberries' antibacterial properties has broadened their use into new areas of cereal, baked goods, trail mix, nutritional bars, smoothies and other nutritional foods. pf

For more information:
Ocean Spray ITG • Middleboro, Mass.
Tom Jones • 508-946-7606
tjones@oceanspray.com • www.oceansprayitg.com • www.oceanspray.com

Q&A: Cranberry Facts

How can cranberries be applied in products? Cranberry purée, which blends well with other fruit purées, is used in smoothies. Cranberry powder is used in nutraceutical applications such as tablets.

Are there other fruits that go well with cranberry? The distinctive taste of cranberry ingredients complements a wide range of fruit and non-fruit flavors.

What about cost; how do cranberries compare to blueberries, raspberries, grapes, etc.? Cranberry ingredients are cost-effective, value-added ingredients which compete with many other dried fruits on cost.

Can you get these other fruits in a dried format which would work in the same applications, or do cranberries have an advantage somehow? Dried cranberries offer multiple benefits over other dried fruits. Their bright color, functionality, distinctive taste and well-known health benefits add value to a wide range of products.

What are typical use levels for dried cranberries in trail mix, cereal bars or breakfast cereal? Use levels are determined by the end user and may vary from product to product.

What is the typical use level for cranberry powder in some examples of applications where it is used? Use levels are determined by the end user and may vary from product to product.

What is the shelflife of these products? BerryFusions Fruits and dried cranberries have a shelflife of two years, if stored at or below 65°F. Cranberry powder has a shelflife of three years when protected from moisture and heat.

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Life-long Health with Prebiotics

Prebiotics are slowly entering mainstream food consciousness, with consumers becoming more aware of their health benefits. BENEO™ inulin and oligofructose prebiotic fiber ingredients from ORAFTI assist in maintaining life-long health from infants to seniors. BENEO is a natural food ingredient from chicory that creates well-balanced food products, improving digestive health, natural defenses and contributing to a sense of well-being. Applications range from use in dairy to bakery products. ORAFTI, Joseph O'Neill, 610-889-9828, www.orafti.com

Fast Track Trends

A second edition of an informative reference guide is now available. Univar USA introduced the new version of its food ingredient reference guide at the IFT Annual Meeting and Food Expo. *Trends for the Fast Track* contains the latest technology advancements within a variety of food and beverage ingredient categories. It reflects the current trends that the R&D community is looking to incorporate into new food and beverage products. Univar USA Inc., Karen Weber-Millstein, 425-889-3475, karen.webermillstein@univarusa.com

Vanilla Goes Wild

Vanilla is no longer just a flavor of ice cream. David Michael has explored alternative uses for vanilla in everything from tomato-based beverages to brown gravy. In savory items, vanilla can enhance natural sweetness, soften an acidic bite and add a signature flavor profile. Showcased at IFT, DM used 2X Vanilla Extract #7867, along with DM Choice Natural Chipotle Flavor and DM Choice Natural Onion & Garlic Flavor to create a delicious Bourbon Bar-B-Que Sauce served with Pork Meatballs. Vanilla's uses continue to grow. David Michael & Co., Erin Kate O'Donnell, 215-632-3100, ext. 1425, eodonnell@dmflavors.com, www.dmflavors.com

Pathogen Protection

Protecting consumers against pathogenic micro-organisms like *Salmonella* is vitally important. An all-natural proprietary ingredient, Cegemett Fresh® from Cognis, kills bacteria by damaging their cell walls. It is designed to inhibit mold, prolong freshness and extend shelflife for a variety of food applications. This allows food processors the potential to eliminate chemical preservatives. Another product by Cognis is Spongolit® 560 Aerating Emulsifier, which helps to improve volume, crumb texture and shelflife. Cognis Nutrition & Health, Scott Backman, 708-579-6188, Scott.backman@cognis.com, www.cognis.com

Texture without Fat

Healthy alternatives continue to be a focus for consumers. International Specialty Products has shown how its Textureze™ Systems can be applied to create healthier foods while still exhibiting the quality of full-fat products. In bakery applications, Textureze systems improve bake stability, taste and appearance while extending shelflife. For imitation and processed cheese, it can reduce stickiness and increase firmness and hot viscosity. In meat, Textureze MT systems allow manufacturers to bind meat without the need for salt and phosphates. International Specialty Products, 888-472-5446, foodinfo@ispcorp.com

Allergies at Bay

A Spanish study recently published in *Pediatric Allergy and Immunology* has concluded that children who eat a diet high in fish and "fruity vegetables," such as tomatoes and aubergines, suffer less from asthma and allergies than those who do not.

A group of 232 boys and 228 girls was studied from the womb until the age of six and a half years old. Those who ate more than 60g of fish and 40g of vegetables daily suffered significantly less from wheezing and allergic reactions than those who did not. The scientists theorize that the children experienced more relief because the fish and fruity vegetables reduced the inflammation associated both with asthma and allergies.

Fool-proof Fiber Additions

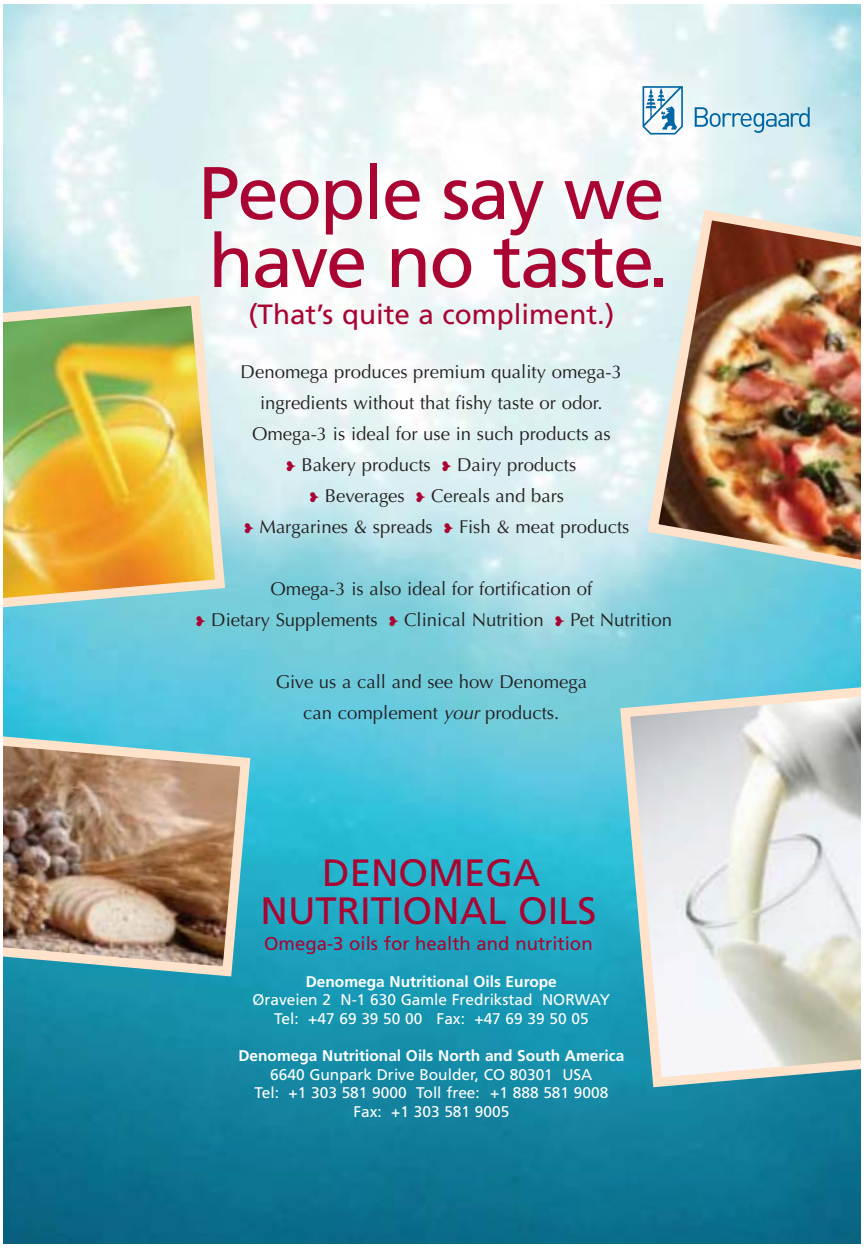
Many Americans do not get the recommended amount of fiber everyday. To help, MGP Ingredients has introduced Fibersym® RW and FiberRite™ RW resistant starches. They are a convenient and rich source of dietary fiber that can be incorporated with minimal processing adjustments. Possessing a clean flavor, smooth texture and white appearance, these starches allow formulators to boost the fiber content of a diverse line of food products from pizza crust to salad dressings—without distorting taste or visual appeal. MGP Ingredients, 800-255-0302

Marvelous Melts

Consumers focus on convenience and simplicity. Armed with that knowledge, Sargento has created saucy Custom Melts™, a line of dairy/cheese-based sauces. Solid at refrigerated temperatures, they come in shreds, cubes, dices and slices. Custom Melts transform into flavorful sauces within a few moments of heating. In applications where products are stirred, the sauce coats evenly and has good cling properties. They offer intense flavor and a cleaner dispensability than ready-made sauces. Sargento Food Ingredients, Dick Williamson, 800-795-7090, www.sargentofoodingredients.com

Sensible and Right

Better taste with healthier solutions is always desired. DSM Food Specialties showcased its Sensarite™ at IFT. Sensarite reduces the amount of salt and fat needed and provides high-impact taste enhancement in bakery and dairy applications. It has a subtle but wide-ranging effect on the flavor of foods. In some, it boosts saltiness, while in others, it reduces bitterness. It also provides strong fat enhancement. Designed with these benefits in mind, the product responds well to today's market needs for less fat and salt. DSM Food Specialties USA Inc., Reto Rieder, 951-461-1619, reto.rieder@dsm.com, www.peptopro.com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Crunchy Chocolate Indulgence

A variety of products were showcased at IFT, including chocolate-coated ice cream with an extra "krunch." Cargill's presentation featured Peter's dark chocolate and Gerkens' cocoa for an indulgent chocolate taste with Fiber Krunch™ crisp for a long-lasting, crunchy texture. Other featured products were whole-grain tortilla chips and dressing with full-salt taste, but less sodium. They featured Cargill's new SaltWise™ sodium reduction system that delivers taste equality of salt at 25-50% less sodium. Cargill, Lori Fligge, 952-742-2275, lori_fligge@cargill.com, www.cargill.com

Progressive Approach

Merging consumer insights with development technology is key to product success. Product Dynamics' team of researchers and developers combine sensory and consumer research methodologies to guide technology applications—delivering innovative product solutions. The company will work with its customers on one aspect of its product development initiative or deliver the entire program—integrating the consumer early and often and using progressive methodologies. Product Dynamics, Judy Lindsey, 708-364-7060, j.lindsey@rqa-inc.com

Extending Shelflife Naturally

Providing solutions to preserve the freshness of food, a food ingredients company has developed products that protect fish oil and omega-3 applications from oxidative degradation. Kemin Food Ingredients also has developed products that can be used in organic applications. FORTIUM® RPT40 liquid antioxidant can be used to delay oxidation in marine oils and has proven to be very effective at extending the shelflife of omega-3 applications. FORTIUM® MT50 IP liquid antioxidant can be used in organic applications, providing a natural solution for extending the shelflife of a variety of applications. Kemin Food Ingredients Inc., Jeff Sporrer, 515-559-5426, jeff.sporrer@kemin.com

Purely Tasty

Not only do consumers want healthy foods that taste great, they also want foods safe from foodborne pathogens. PURAC's Smart Food Solutions help processors deliver products that are safe, nutritious and delicious. The line of PURAC® Fresh products enables processors to achieve maximum food safety and a neutral flavor profile with a label-friendly ingredient. One example at IFT was Tuscan Meatballs. It used PURASAL® Powder S sodium lactate powder blended in the seasoning for a superb taste, extended shelflife, increased food safety and enhanced flavor. PURAC America, Eva Dratwa, 847-634-6330, www.purac.com/meatandpoultry

Danisco's 2007 Knowledge Award Winners

COLLEGE OF AGRICULTURE
KANSAS STATE UNIVERSITY

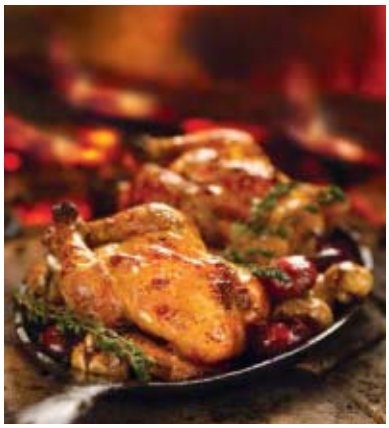
A stuffed, breaded beef entrée called Fiesta Braciole was the winning entry in the 4th annual Danisco USA's 2007 Knowledge Awards. Jeremy Hinkle, a senior at Kansas State University, created the dish, which took the top prize in a competition that was established to recognize and foster innovation among food science students at universities throughout the U.S. It gives students the opportunity to use their academic knowledge and practical skills in a real-world situation.

Beginning in May, a panel of independent food industry judges evaluates the top finalists based on the criteria of taste, marketability and novelty. The winning Fiesta Braciole is a convenient, pre-prepared entrée that can easily be thawed and baked. The breading on the product has a delightful mouthfeel and is visually pleasing, topped with white cheese sauce. The ground beef contains GRINDSTED® Meatbinder 2-540 for improved texture and GUARDIAN™ Rosemary Extract 09 for flavor protection and improved storage stability.

A team from the University of Idaho took second place with Spoon-Its, a product that combines citrus guava yogurt with a cranberry-granola, spoon-shaped cookie. Adam Tegeler and his team used eight Danisco products in the final formulation, including Benefat®B and Litesse® polydextrose for reduced fat and calories. Third place was awarded to a team from California Polytechnic State University, where leader Paula Durongwong developed Lets Dip, a new gourmet artichoke cheese dip with unique, flavored crackers that used Panodan® 150K for emulsification and minimized oiling-off in baking.

The winners will be presented their awards at *Prepared Foods*' 25th Annual New Products Conference, which will be held October 14-17, 2007, at Naples Grande Resort in Naples, Fla.

— Barbara T. Nessinger, Associate Editor



Old World Meets New

The art of old world, wood-fired oven cooking was brought back at IFT. Kraft introduced Fire Roasted Flavor, which falls under Kraft's Flavors of Cooking™ line. It is a versatile, well-balanced, natural flavor that delivers a fatty, savory-brown, smoked taste to any application including chicken, beef, dressings, vegetables, pizzas and appetizers. Available in powder form, the new flavor comes in Fire Roasted and Fire Roasted Potato, with a shelflife of 12 months when stored in a cool, dry place. Kraft Food Ingredients Corp., Todd Hrubes, 901-381-6533, www.kraftfoodingredients.com

Packing Healthy

As consumers demand functional foods, a leading global packaging and process equipment company works with customers to create healthier, more convenient products for consumers. TetraPak®'s Healthy Kidz Immunity Boost, showcased at IFT, is a new healthy drink for kids aged two to seven. The milk-based nutritional beverage is a prebiotic drink, and antioxidant vitamins A, C and E were added to assist with the body's natural defenses. Tetra Pak USA, Jeff Kellar, 847-955-6000, jeff.kellar@tetrapak.com, www.tetrapakusa.com

Lower Salt without Taste Loss

A new salt reduction product was introduced to the U.S. food industry at IFT. Jungbunzlauer's sub4salt® claims to allow manufacturers to cut salt content by up to 50% without losses in taste. Sub4salt has three primary benefits: it can achieve similar sensory characteristics to salt; it has no metallic potassium chloride aftertaste; and its usage and handling are similar to those of salt. Jungbunzlauer said the patent-pending mineral salts blend has shown "superior" results in applications including bakery products, snack seasonings and meat products. Jungbunzlauer, 800-828-0062, info@jungbunzlauer.com, www.jungbunzlauer.com

Glittering Goodies

Silver and gold are not just for the holidays anymore. Edible Glitter from Watson Inc. is a quick and easy way to add shimmer to food items. The FDA has approved the use of

ABF ingredients

The Future of Protein

Protient is an innovative, expanding company. Our food scientists and technicians are committed to research, development and meeting your protein needs today...and in the future.

We manufacture a full compliment of whey proteins and milk proteins using proprietary ultrafiltration processes. Each of our plants is dedicated to either milk or whey.

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www.abfingredients.com

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mica-based pearlescent pigments for use as color additives in cereals, confections and frostings, gelatin desserts, hard and soft candies, nutritional supplement tablets and chewing gum. This product can be employed in pharmaceutical (use limit is 30%) and in food (use limit is 12.5%) applications. Watson Inc., 800-388-3481, info@watson-inc.com, www.watson-inc.com

Free CD with "Eggcellent" Technical Information

A new CD is filled with scientific-based technical information, complete with summaries of egg product research, nutritional information, reference data and much more. The CD, titled "American Egg Board Egg Product Information Resource," is now available. The information details how incredible egg products help meet today's formulation challenges, including gluten-free, trans fat-free and satiety, as well as eggs' uses in boosting energy. Just some of the information includes a description of over 20 functions of eggs, their applications, equivalency conversion, chemical composition and nutritional value, as well as valuable information for the food formulator that explains how egg products work in product formulation. Quantities are limited. Visit www.aeb.org/EggProducts/resource_CD/index.html to order.

More Fruit, More Flavor

Today's consumers want products with creamy texture, more spreadability and more fruit flavor. Created in the global trend of reducing sugar, Danisco's GRINDSTED® Pectin SF EXTRA line makes low-sugar fruit spreads easy and flavorful. The GRINDSTED® Pectin SF EXTRA series delivers all these textural requirements, along with exceptional flavor enhancement—giving spreads a firm, yet spreadable texture while preserving fruit pieces. Because the pectin line has a lower viscosity, it has a faster flavor release. Danisco USA Inc., Ellen Trost, 800-255-6837

Enhancing Flavor Perception

Reducing salt and sugar is a priority for many health-focused consumers. Flavor Modulation Technology from Mastertaste gives food and beverage manufacturers options to create new and healthier alternatives to current product lines. The technology would allow them to reduce sodium in some products up to 50% by enhancing taste perception. Using these modulators to reduce salt, they improve the awareness of salinity with all-natural flavor systems. The modulators also improve the aftertaste of products containing diet, non-nutritive sweeteners. Mastertaste, Nancy Lawrence, 201-708-9264, nancy.lawrence@mastertaste.com

Celebrating America's Tastes

America's many great regional tastes and cuisines were highlighted in a unique experience at IFT. Virginia Dare offered a variety of exciting taste experiences from diverse regions of the U.S. under the theme "Great Tastes of America." Foods and beverages were offered for sampling, demonstrating regional tastes. Each was created using Virginia Dare flavors or extracts, including Original New York Strawberry Cheesecake Smoothie, New England Maple Healthy Baked Snacks and Country Fair Cherry Lemonade. At the center of

Link Between Toddler Obesity and Iron Deficiency

Researchers who analyzed data from almost 1,000 U.S. toddlers tested for iron deficiency found that 20% of the obese children suffered from a deficiency, compared with 7% of toddlers of normal weight. A lack of iron can cause mental and behavioral delays, reduce the amount of oxygen carried throughout the body and also result in anemia.

It is theorized that the obese toddlers became iron-deficient because they drank too much juice and cow's milk from a bottle, instead of being weaned and eating foods rich in iron (such as meat, eggs, fortified breads, etc.).

Alarmingly, some 12% of Hispanic toddlers were iron deficient, as compared with 6% of white children and 6% of black children. One hypothesis suggested that Hispanic children were least likely to be in day care, where care providers seem to be more aware of proper nutritional practices.

The study was published in the September 2007 issue of *Pediatrics* and was based on data from the National Health and Nutrition Examination survey (1999-2002), conducted by a branch of the U.S. Centers for Disease Control and Prevention.

the exhibit was an ice cream bar serving Ice Cream Parlor Vanilla Ice Cream, along with flavored toppings representing regions from New England to Georgia. Virginia Dare, Paulette Kerner, 410-569-9766, pkerner@virginiadare.com, www.virginiadare.com

New Citrus Brand

A new global brand combines a company's unique citrus competence under one umbrella. NATURALLY CITRUS!® is the innovative platform for flavors and fragrances manufacturer Symrise to bundle its one-of-a-kind expertise in the field of citrus flavorings. By launching this brand, Symrise combines its wide-ranging product palette of citrus flavorings, its innovative technologies and its investments in one of the most important citrus-growing countries in the world. Symrise's international citrus initiative is being launched via its Global Citrus Center, which is currently being built in Sorocaba, Brazil. Symrise, www.symrise.com

Color-developing Ingredients

Having trouble browning gluten-free foods? Challenged to formulate an organic food normally colored by black cocoa—a difficult and expensive ingredient to source as organic? BriesSweet™ White Sorghum Syrup, produced from the starchy heads of the grain (not the cane) of the sorghum plant, and intense black-colored Organic Briess® Black Cocoa Replacer, an all-natural ingredient milled from 100% pure roasted barley that can be used as a 1:1 replacement for black cocoa, are specialty food ingredients to help formulators solve unique color development challenges. Both ingredients are all-natural and offer multiple benefits that can help food manufacturers achieve a variety of label claims. Briess Malt & Ingredients Company, Bernadette Wasdovitch, 920-849-7711, bwasdovitch@briess.com

Meeting Morning Needs

Showcasing their new concepts at IFT, one company is building great-tasting solutions around bringing balanced nutrition and health benefits to morning meals. The Solae Company enables companies to meet consumers' needs with solutions addressing all seven consumer needs states. One breakfast vegetarian option is the Spicy Breakfast Wrap—a hearty, protein-packed breakfast for the family on the go. Featuring Mexican-spiced fajita strips made from quality vegetable protein, it provides a nutritious and affordable option with half the fat and cholesterol. The Solae Company, www.solae.com

Positive Pea Protein

The alternative protein market is growing at a rapid pace as consumers look for gluten-free, non-genetically modified, all-natural and vegetable-based protein sources. NUTRALYS® pea protein from Roquette meets nutritional needs and does not need to be labeled as an allergen. It is a concentrated protein source obtained from a water-only extraction process, containing 85% protein. NUTRALYS pea protein is also rich in both essential and non-essential amino acids. Roquette America, Chandani Perera, Chandani.perera@roquette.com, www.roquette.com

How Sweet It Is

Healthier beverages and foods are making their way into consumers' diets more often, with water consistently at the top of the list. The water distributed by Wixon at IFT was made with Mag-nifique™ Sweet Lift, which contains a proprietary blend of natural flavors that synergistically works with sugar to enhance sweetness perception, reducing sugar content by 50%. It can be used in any application containing sugar and does not break down or alter during cooking, freezing or when stored on the shelf. Wixon Inc., 414-769-3000, fran_seidita@wixon.com, www.wixon.com

Naturally Enhanced Meat Flavor

Two new meat product enhancement products show promise. Natural Powdered Beef Fat, a new addition to the International Dehydrated Foods' product line, will enhance beef seasoning, dry gravy mixes, marinades, dry soup mixes and injection solutions. Another product, Premium Chicken Broth, can be used in creamy soups, pot pies, gravies and marinades. It is processed to maximize mouthfeel and chicken flavor. Like all IDF products, both are naturally flavored and minimally processed. International Dehydrated Foods Inc., Mary Cathey, 417-881-7820, mcathey@idf.com Pf

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Enjoy ALL the benefits of buying delicious and nutritious almonds from a trusted grower and supplier who understands your needs. Every almond must pass our stringent quality standards, and yours, to earn the Golden West Nuts stamp of approval. We can supply a complete line of almond products customized to your production requirements. It's one choice that can make all the difference. Choose Golden West Nuts Almonds.

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IFT Portraits | 2007

advertorial

ADM

ADM Introduces SmartBind™

At this year's IFT, ADM introduced new SmartBind™ natural wheat proteins. Both functional and nutritional, SmartBind is ideal for health and wellness applications such as nutrition bars, cereal coatings, whole grain baked goods, microwavable bakery products and more.

"SmartBind is a natural extension of ADM's existing line of proteins and protein isolate application expertise," said Neal Bassi, director of sales, wheat starch and proteins, ADM Milling. "Our technical and application team developed SmartBind to help food manufacturers meet the increasing consumer demand for nutritious foods made with natural ingredients."

SmartBind also provides the unique functionality of sugar or fat in delicate systems to deliver desired texture and flavor with added protein. It can be used in products that require natural ingredients to increase protein, enhance structure, reduce sugar and fat, and replace eggs or dairy products.

For further information, contact:
ADM
4666 Faries Parkway
Decatur, IL 62526
United States
800-637-5843
info@admworld.com
www.admworld.com

ADM
RESOURCEFUL BY NATURE™

ADM/Matsutani LLC

Fibersol® -2 digestion resistant maltodextrin (90% min. DSB), is the first high-fiber source to fortify without compromising taste, color, or texture. This multifunctional ingredient extends shelf life, enhances texture, and improves flavor in a variety of applications.

Nutritionally and analytically, it meets the definition of dietary fiber for nutrition labeling purposes as published by the American Association of Cereal Chemists and the U.S. National Academy of Sciences.

It offers excellent functionality for your formulations. Soluble in water up to 70% (w/w) at 20°C, it is readily dispersible, thus effective in transparent solutions and dry drink mix applications.

It modifies and improves the sweetness and aftertaste performance of many sweeteners, allowing for flavor, sweetness, and mouthfeel enhancement in a variety of low calorie foods. You can also use it to create products with a lower Glycemic Index or Glycemic Load.

Fibersol-2 digestion resistant maltodextrin offers acid, heat, and freeze-thaw stability. It retains its characteristics and functionality throughout processing and distribution.

Fibersol-2 digestion resistant maltodextrin is a product of ADM/Matsutani LLC, a joint venture of Matsutani America and Archer Daniels Midland Company, both of Decatur, IL, USA. Inquiries are invited at +1 217-451-4377 or www.matsutaniamerica.com.

Fibersol® is a registered trademark of Matsutani Chemical Industry Co. Ltd.

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217-875-9821 (fax)
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www.matsutaniamerica.com

Matsutani America, Inc.

Ajinomoto Food Ingredients

Ajinomoto Food Ingredients - (Supplier)

In the food business for nearly a century, the Ajinomoto Company Inc. has provided both tasty and healthful products to Consumers around the Globe. Literally translated, Ajinomoto means "the essence of taste."

Ajinomoto established its name with its signature product, monosodium glutamate, and later ventured into amino acids, artificial sweeteners, savory ingredients and specialty ingredients. Ajinomoto has embraced a management philosophy focused in making significant advances in food and health on a global basis. That is, products that not only taste good; they are good for you.

As its name implies, Ajinomoto provides the "essence of taste," and it has done so without compromise for nearly 100 years.

Link to www.ajiusafood.com for more information.

For further information, contact:
Primary contact:
Brendan Naulty
VP Sales & Marketing
8430 West Bryn Mawr Avenue
Suite 635
Chicago, IL 60631
Phone: 773-308-7852
Fax: 773-714-1431

AJINOMOTO

American Egg Board

American Egg Board (AEB) is the U.S. egg producers' communications link to food processors. As the egg industry's promotional organization, AEB works to educate manufacturers and developers of new food products about the functionality and nutritional benefits of eggs. The egg is still one of nature's most perfect foods and can help make other foods perfect, too. In fact, eggs perform multiple functions in the making and processing of foods, while simplifying the ingredient statement. AEB develops and distributes resource materials to assist product developers, shares timely tips and trend information through a quarterly newsletter and a monthly e-newsletter, and also makes available egg product experts to answer technical questions.

For more information about American Egg Board promotional efforts and activities, or facts on egg products, nutrition, technical specifications and formulas, visit us at our web site: www.aeb.org.

For further information, contact:
Elisa Maloberti
Director Egg Products Marketing
1460 Renaissance Drive
Park Ridge, IL 60068-1340
847.296.7043
Email: aeb@aeb.org
www.aeb.org

Bioenergy Life Science, Inc.

Absolute Energy
Bioenergy Life Science is the world leader in D-ribose. The Company offers branded, value-added bioactive ingredients for functional foods, beverages, nutraceuticals and cosmoceuticals. Bioenergy RIBOSE™ addresses needs affecting millions worldwide, including congestive heart failure, ischemic heart disease, neuromuscular disease, fatigue, anti-aging, sports nutrition, and energy health.

Years of research conducted at leading academic centers in the U.S. and Europe have demonstrated that D-ribose provides metabolic support to the body during and following hypoxic stress or in cases of metabolic dysfunction. D-Ribose amplifies the body's natural response to metabolic stress and acts to increase the hypoxic threshold of tissue, protecting it from oxygen deprivation and stimulating recovery following hypoxia or in cases of dysfunctional energy metabolism. D-Ribose is all natural, safe, and clinically proven.

Technology, Patents, New Products:
- 29 issued or pending patents covering broad applications for D-ribose in medicine, nutrition, and veterinary care.
- Does not raise blood sugar level.
- Safe, effective and all natural.

Major Applications:
- Functional foods, beverages, sports nutrition, anti-aging products, supplements, dairy beverages, nutrition/health/meal replacement bars, clinical nutrition, and more.

Major Products:
- Bioenergy RIBOSE™ branded D-ribose ingredient for functional food and beverage.
- Riboxyl™ branded D-ribose ingredient for cosmetics.

For further information, contact:
Bioenergy Life Science, Inc.
13840 Johnson Street NE
Ham Lake, MN 55304
Phone: 763-757-0032
Toll Free: 1-877-4RIBOSE
Fax: 763-757-0588
www.bioenergy.com

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BRENNTAG is the global leader in the distribution of a full menu of food and nutritional ingredients. Let us cater to your needs with products that range from fundamentals to specialties.

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www.brenntagspecialties.com

Butter Buds Food Ingredients

Butter Buds Food Ingredients manufactures a line of natural dairy concentrates: Butter Buds®, Cheese Buds®, Cream Buds™, and Buttermilk Buds®. These ingredients provide the rich flavors of butter, cheese, cream, and buttermilk. They are also used to mask off-flavors (such as soy), round out harsh notes, and enhance savory and sweet flavors – while saving cost and adding insignificant fat.

The Butter Buds line has proven effective for improving taste in almost any kind of food product, including meats, bakery, snacks, soups, sauces and dressings.

The company also makes CocoaButter Buds™, a unique, natural solution for enriching chocolate flavor without adding additional fat, and Dried Beer Extract™ a non-alcoholic, natural beer concentrate in powdered form, perfect for imparting beer flavor to batters, meats, baked good and snack seasonings.

For further information, contact:
Butter Buds Food Ingredients
2330 Chicory Road
Racine, Wisconsin 53403
262.598.9900
bbfi@bbuds.com
www.bbuds.com

ButterBuds℠
FOOD INGREDIENTS

California Raisin Marketing Board

CALIFORNIA RAISINS– The surest path to success begins not with the product, but with what's in it.

California Raisins are always the wise choice. On their own or in some of the industry's favorite food products, California Raisins deliver unique flavor, dietary fiber, essential nutrients and important antioxidants — all self-contained in a deliciously, sunsweetened fruit ingredient.

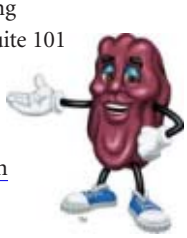
Whether used to enhance flavors, eliminate or reduce fat content, or simply to extend shelf-life, California Raisins are the ingredient that is always the wise choice. Why? Because not only do California Raisins transform the character of certain foods, they also maintain structural integrity during processing. California Raisins have a great emulsifying quality when added to vinaigrettes, not to mention, acting as an excellent base ingredient to naturally help bind dry ingredients together.

Like in his New York Steak with Salsas Pasitas Blancas (White Salsa with Raisins) featured here, Chef Robert Del Grande deploys California Raisins in novel combinations with salty, crunchy, spicy and smoky ingredients to achieve a spectrum of subtle and balanced flavors.

Regardless of how they are used, raisins provide healthy, sun sweetened flavor from California's San Joaquin Valley and are always a wise choice in product research and development.

Flavor Meets Functionality: the Way of the California Raisin

For further information, contact:
California Raisin Marketing Board
Karla Stockli
Vice President of Marketing
3445 North First Street, Suite 101
Fresno, CA 93726
559-248-0287 - phone
559-224-7016 - fax
www.LoveYourRaisins.com



Cargill

Fiber Krunch™ Crisps Deliver Superior Crispness Retention
Manufacturers benefit from extended shelf-life

MINNEAPOLIS – Cargill Texturizing Solutions featured a new application for Fiber Krunch™ crisps that delivers superior crispness retention during freezer storage in ice cream novelties. The result is extended shelf life, improved product quality and enhanced consumer satisfaction.

Independent sensory studies confirm that Fiber Krunch™ maintains crispness when formulated in an ice cream coating. Over a six week test period, standard rice crisps lost their crispness while Fiber Krunch™ crisps changed minimally.

The sustainable crunch is the result of combining the fibers in ActiStar™ resistant starch and chicory. The proprietary ingredient system in Fiber Krunch™ contains 35% dietary fiber so food manufacturers can easily achieve "good" to "excellent source" dietary fiber claims. The extruded crisp, which resembles crisp rice, has 35% fewer calories than many carbohydrates (2.6) kcals/g compared to 4kcals/g for typical carbohydrates).

Fiber Krunch™ can be easily incorporated into food products with minimal development time or formulation changes.

Call 877-650-7080 or visit www.cargilltexturizing.com for more information.

For further information, contact:
15407 McGinty Rd W
Wayzata, MN 55391-2399
877-650-7080
www.cargilltexturizing.com

Cargill™

Cargill

At this year's IFT show, Cargill introduced SaltWise™, a proprietary new family of sodium reduction systems. With SaltWise™ systems, food manufacturers can significantly reduce sodium levels by 25 to 50 percent in their product formulations while delivering the great salt flavor consumers love.

SaltWise™ systems can deliver taste parity versus salt at 33 percent sodium reduction in many applications, including prepared foods, frozen meals, meat and poultry, soups, sauces and dressings, and salted snacks.

SaltWise™ systems handle like salt and are as easy to use as salt in a variety of applications. It is a granular system that flows like salt, is readily soluble in water, and is stable to heat, acid, dehydration and freeze/thaw processes. SaltWise™ systems are GRAS (Generally Recognized As Safe) for their intended use, non-allergenic and kosher. Currently SaltWise™ is available in North America.

For product specifications and samples, please contact Paul Vajda at (952) 742-6453 or paul_vajda@cargill.com.

For further information, contact:
Cargill
P.O. Box 9300
Minneapolis, MN 55440-9300
1-800-CARGILL
www.cargill.com

Cargill™

Cargill, Incorporated

Customers and prospective customers who visited Cargill's IFT booth had the opportunity to sample 13 food and beverage prototypes that addressed everything from health issues - such as weight management, energy management, sodium management and heart health - to satisfying consumer cravings for pure indulgence. The prototypes, can be viewed at www.cargill.com/ift.

In addition, Cargill's presence at IFT extended far beyond the perimeter of the booth. Cargill experts presented and/or moderated 14 different technical sessions on a range of timely topics, including "new developments in creating gluten-free foods," "hydrocolloids and the effects of viscosity on blood glucose and cholesterol," "diversity and multinational teams in the food industry," and "the future role of functional foods for improved public health."

For product specifications and samples, please contact us at 1-800-CARGILL (227-4455) or visit www.cargill.com.

collaborate > create > succeed

Cargill™

Cargill Kitchen Solutions

Sunny Fresh Egg Innovations from Cargill Kitchen Solutions

The opportunity for breakfast products is big, bold and on the rise. Food manufacturers turn to Cargill Kitchen Solutions for expertise to help them launch successful new products that capitalize on growing breakfast trends.

The makers of Sunny Fresh™ value-added egg products, Cargill Kitchen Solutions™ collaborates with customers to drive innovation in egg ingredients. It specializes in custom solutions, drawing on its vast product development resources to introduce inventive and profitable egg and breakfast products. It offers proven expertise in solving taste, texture, shape and processing challenges critical to the success of new breakfast products.

The Sunny Fresh brand has been known for high quality products, first-to-market innovation, and unparalleled customer service for more than 20 years. Learn more about how Sunny Fresh products, expertise and insights can help you launch popular new breakfast products that differentiate your brand.

For further information, contact:
Cargill Kitchen Solutions
206 West Fourth Street
Monticello, MN 55362
1-800-USA-EGGS

Cargill™

CNI – Colloides Naturels Inc.

At this year's IFT show, CNI – Colloides Naturels International introduced Equacia™. Equacia™'s texture is unique and mimics perfectly, more than any other products, rheological and mouthfeel properties of fat or sugar.

Equacia™ is a full line of co-processed ingredients based on two all-natural dietary fibers: Acacia fiber, a soluble fiber and wheat fiber, an insoluble fiber. Equacia™ is manufactured using a state-of-the-art technology, which is CNI's proprietary. It's not at all a simple dry blend because the insoluble fiber particles are uniformly encapsulated / integrated into the soluble fiber matrix. Equacia™ is cold water dispersible and develops its viscosity immediately after dissolution in water. It requires no heating or shearing for activation, to develop its unique smooth texture. It's a pure synergetic co-processed product.

Equacia™ is a dust-free instantized pure powder that is extremely easy to dissolve in cold water even at high concentration. Equacia™ is resilient to most processing conditions (high shear, temperature or pH extremes).

Equacia™ is all-natural, FDA-GRAS, GMO-free and gluten-free.

For product specifications and samples, please contact: samples@cnius.com

CNI COLLOÏDES NATURELS INC.

Cognis® Nutrition & Health

Newtrition™ from Cognis is your opportunity to meet the increasing demands for innovative, effective and safe functional foods and beverages. Cognis offers naturally-sourced ingredients that can help you create cutting-edge products, and position your business for long-term growth.

Omevital™ Omega-3 Fatty Acids.
The building-block for enhanced health and vitality.

Vegapure® Plant Sterols and Sterol Esters.
The natural ingredient for heart health.

TONALIN® CLA.
The fat fighter for leaner, healthier bodies.

Xangold® Natural Lutein Esters.
The Gold Standard™ for natural eye health.

Give your products a healthy competitive edge with **New**trition. Only from Cognis.

cognis
we know how

D.D. Williamson

D.D. Williamson, the world leader in caramel color, now offers a broad spectrum of natural colors, including its colorMaker™ custom blends. At the IFT expo, the company introduced a new, expanded booth featuring a dramatic new design. The new booth illustrated D.D. Williamson's updated brand identity reflecting its growing portfolio of natural colors.

Booth demonstrations included: New natural colorants - annatto extract, turmeric, paprika, red beet, and anthocyanins; and certified organic caramel color featuring Quality Assurance International (QAI) as D.D. Williamson's certifying agent for USDA's National Organic Program (NOP). Sample bite-size cheesecakes — topped with DDW natural colors, were provided along with samples of colorMaker custom blends in naturally colored hard candy.

DDWilliamson
Color With Confidence

For further information, contact:
Thom Dotter, Sales Manager
D.D. Williamson
Tel: +1 502 582 7349
E-mail: info@ddwmson.com
www.ddwilliamson.com

Denomega Nutrional Oils

Denomega Nutrional Oils is a leading manufacturer of all natural taste- and odor-free Omega-3 ingredients. We begin with the freshest starting materials in the industry and have a truly sustainable supply. Our Omega-3 is in a wide variety of food and beverage products on five continents. We can assist in incorporating Omega-3 into your product without any impact on taste or odor.

Denomega
Nutritional Oils

You wouldn't want to drink spoiled milk that has been "cleaned up" to make it palatable would you? Of course not, yet that is what many producers of omega-3 oils are doing with their oil. At Denomega we take a different approach. Our unique, patented, cold press method of extracting oil enables us to produce the only taste and odor free fish oil on the market. Rather than try and make a fishy oil taste good, we start with good oil and keep it that way.

DSM Nutritional Products, Inc.

DSM NUTRITIONAL PRODUCTS: ASSURING FOOD AND BEVERAGE MANUFACTURERS THAT QUALITY IS ITS MOST IMPORTANT INGREDIENT

As the world's premier ingredient supplier to producers of foods, beverages, and dietary supplements, DSM Nutritional Products assures the quality of its raw materials and finished products through rigorous adherence to quality control procedures.

DSM requires that its raw material suppliers meet all relevant regulatory standards, including United States Pharmacopoeia (USP), European Pharmacopoeia (EP), and Food Chemicals Codex (FCC) monographs.

DSM applies the same quality standards to its finished products as well, subjecting them to stringent physical, chemical, and microbiological testing in accordance with USP, EP, and FCC standards before release for sale.

DSM Nutritional Products has an international network of technical service, production and distribution facilities as well as sales and marketing presence in more than 100 countries. In addition to its vast ingredient portfolio, DSM provides unparalleled processing and manufacturing

expertise in developing innovative formulations that provide optimum performance and health appeal.

For more information, contact DSM Nutritional Products, Inc., at 45 Waterview Boulevard, Parsippany, NJ, 07054-1298. Phone: 1-800-526-0189. Website: www.nutraaccess.com

Fortitech, Inc.

Fortitech, Inc., the world leader in custom nutrient premixes, focused on increased energy, improved cardio health and weight control at IFT this year. While weight management is an exponentially growing issue worldwide, consumers and new product developers are struggling to find great-tasting, cost effective products to satisfy hunger add energy and improve cardio. With this in mind, Fortitech developed a **Weight-Management Popcorn** premix – A truly unique functional application idea! Fortitech's popcorn premix contains nutrients that can help with weight management for weight-conscious consumers. This specific blend contains niacin, pantothenic acid, chromium, L-carnitine, CLA, green tea extract, calcium and potassium. Fortitech also displayed **Energy-Fortified Lollipops** – Packed with 16 different nutrients, these adult-targeted energy-boosting lollipops are designed for people taking long trips in the car or anyone who is looking for a long-term boost of energy. The lollipops contain

elevated levels of folic acid, biotin, niacin, pantothenic acid, iodine, zinc choline and vitamins A, C, D3, E, and a complete B-vitamin complex. Finally, IFT visitors got to sample **Energy-Fortified Jellybeans**. Another innovative application idea from Fortitech designed for adults. With 12 vitamins and nutraceuticals, Fortitech's jellybean premix can be used to create a powerful energy-boost in a convenient confectionery application. The energy jelly beans are loaded with vitamins B12, B6, CoQ10, pantothenic acid, niacin, folic acid, biotin, taurine, D-Glucoronolactone and D-Ribose.

For further information, contact:
Fortitech, Inc.
Riverside Technology Park
2105 Technology Drive
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FORTITECH STRATEGIC NUTRITION

GNT USA, Inc.

At this year's IFT Expo, GNT showcased the **EXBERRY®** line of all-natural colors in applications such as beverages, confections, salad dressings, and cereals. Available in powder or liquid, **EXBERRY®** colors are organic compliant, Kosher, and GMO-free.

GNT USA, Inc. is the US subsidiary of the GNT-Group, an innovative pioneer in advanced food technology which manufactures **EXBERRY®** natural food colorings and **Nutri*food*®** standardized extracts. GNT is the world's largest base producer of natural colors made from fruits and vegetables and has been serving the natural coloring needs of the global food industry for over 30 years.

Excellent customer service and high quality products are why customers are always satisfied. With the ability to control the raw materials, GNT provides customers with consistent supply at stable prices.

GNT's color specialists are always available to assist with color matching or color application projects. For samples or technical information, please contact GNT at:

For further information, contact:
GNT USA, Inc.
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info@gntusa.com
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GNT
EXBERRY® ...natural colors

Gold Coast Ingredients, Inc.

Gold Coast Ingredients continues to satisfy the Flavor needs of all aspects of the Food Industry; Bakery, Beverage, Confectionary, Dairy, Entrees, Health & Beauty, Nutraceutical, Pharmaceutical, and Snack Foods. From creating new Custom Formulated Flavor ideas and Color Blends for Research and Development departments to providing low minimums and short-lead times for Purchasing departments. Certified Organic, Non-GMO and Natural Flavors are available in Liquid, Powdered or Spray-Dried forms.

Experiencing world-wide growth, Gold Coast Ingredients has expanded their presence in South East Asia providing service and products from their plant in Shenzhen China. The Gold Coast Ingredients Shenzhen plant insures world standard of sanitation and quality for customers with production facilities in China and OEM manufacturers.

During the IFT Annual Food Expo in Chicago, Gold Coast Ingredients displayed a variety of new ethnic flavors that have been developed by their extensive Research and Development Laboratory. Wasabi Flavor showcased in a delicious Potato Cracker was a popular treat for IFT attendees along with packets of mints made from unique flavor blend combinations of Green Apple, Lemongrass, Coffee and Creamy Vanilla.

For further information, contact:
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Contact name: Michele Trent, Corporate Sales Manager
James Sgro, President
Website: www.goldcoastinc.com

GOLD COAST™ ingredients, inc. Flavor Fusion®

Grain Millers, Inc.

Grain Millers, Inc., North America's largest industrial specialty grain miller, has a full line of conventional and organic whole grain products, such as, oats, wheat, barley, rye, triticale, corn, soybeans, flax, oat fiber, stabilized whole wheat flour and hydrocolloids. Each of these products can be custom milled to meet your needs within the fast moving functional food market.

Processors will be able to incorporate our entire line of products in an array of different products, such as, breads, ready-to-eat cereals, snack foods, nutritional bars, drinks, tortillas, pizza dough, pita breads, spice blends, gravy mixes, taco & ice cream shells and meat products. Our oat fiber and hydrocolloids also provide the ability to improve yields by limiting attrition and increasing the use of water and/or fat within your systems. In addition, our fibers are produced naturally without the use of chemicals, which provides phytochemical benefits other fibers are not able to claim.

Grain Millers is the first company to provide the industrial processor with a clean label oat fiber and other natural ingredients. From our full line of conventional and organic grains and fiber products to our state-of-the-art mixing and blending facilities, your company will be guaranteed the cutting edge in "Whole Grain" technology and services. Please call us for more information or to ask how we can assist in your product development.

For further information, contact:
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GRAIN MILLERS INCORPORATED

Grain Processing Corporation

This year at the annual IFT Food Expo, Grain Processing Corporation (GPC) showcased "ballpark" style foods that provided good sources of fiber with TruBran® corn bran. And, introduced for the first time, was MALTRIN OR™ organic maltodextrin.

TruBran® corn bran was included in the batter portion of a corn dog and also in corn tortilla chips. Each product provided a "good source" of fiber at three grams per serving. TruBran® corn bran has a very clean flavor profile and is easily incorporated into many applications as a fiber source.

Highlighting its dispersability and clean flavor profile, MALTRIN OR™ organic maltodextrin was shown in an organic lemonade slush. The new MALTRIN OR™ organic maltodextrin, like regular MALTRIN® maltodextrin, helps add body to the beverage and aids in dispersion of other dry ingredients.

PURE-GEL® and INSCOSITY® modified food starches and MALTRIN® maltodextrins were also featured in various applications demonstrating their texture enhancing and stabilizing properties.

For more information and samples contact Grain Processing Corporation.

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Web Site: www.grainprocessing.com

Where Innovation Comes Naturally
GPC

Hilmar Ingredients

Hilmar Ingredients (we were in booth #3570)
Located in California's Central Valley, Hilmar Ingredients' headquarters is the world's largest single-site manufacturing operation of cheese and whey products. A new, state-of-the-art facility in Dalhart, Texas expands the flexibility of our whey protein production, assuring customers of consistent, year-round product availability. And our proximity to the Ports of Oakland (CA) and Houston (TX) allows for easy access to the world's markets.

Clear protein fortification in waters and juices, texture improvement in food bars, and a source of complete protein with the essential amino acids in a perfect blend for human health – Hilmar whey proteins provide both functional and nutritional advantages. Our 8000 series of whey proteins includes 80% WPC, tabletting and alphalactalbumin-enriched WPC, plus a range of hydrolysates; and our 9000 series includes uniquely manufactured WPIs with both IX and MF characteristics. In addition, we produce the 5000 series of high-purity refined and USP pharmaceutical lactose.

Our whey protein and lactose adhere to the most stringent international industry standards, and are Kosher and Halal approved.

Hilmar Ingredients also provides technical, processing and formulation assistance. We have a fully equipped pilot kitchen and protein research lab staffed by experienced scientists – all designed to help you discover the promise of dairy in your food or beverage.

For further information, contact:
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Hilmar, CA 95324 USA
www.hilmaringredients.com

HILMAR INGREDIENTS
We deliver the promise of dairy.

Innophos, Inc.

Innophos, Inc., (IPHS) is the leading North American producer of phosphates and the premier source for electrolytes, sequestrants, calcium, magnesium, potassium and phosphorus to enhance and fortify your formulations. At this year's IFT, VersaCAL® Clear, a highly soluble calcium source specifically designed for use in clear beverages was featured. VersaCAL® Clear has a clean taste and is an excellent source of calcium and phosphorus, which together are essential for developing good bone health.

Also featured was CURAVIS® So-Lo 93, the new low sodium phosphate blend for processed meat and poultry applications, with 93% less sodium. CURAVIS® So-Lo 93 achieves excellent binding qualities with good flavor impact.

For further information, contact:
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Innophos

InterHealth Nutraceuticals, Inc.

Since 1987, InterHealth Nutraceuticals has been a leader in the research of innovative, value-added ingredients.

SUPER CITRIMAX®—The only GRAS-affirmed natural weight-management ingredient clinically proven to burn fat and reduce caloric intake by 25%, thereby helping consumers to eat less. Extracted from the south Asian fruit Garcinia cambogia, Super CitriMax is a unique, patented form of (–)-hydroxycitric acid (HCA) bound to calcium and potassium, which dramatically enhances the solubility and sensory profile of HCA. Super CitriMax is highly soluble, heat-stable and virtually tasteless, odorless and colorless in solution. Super CitriMax® is a smart choice for food and beverage manufacturers helping them cut through the clutter and enhance their product line based on market trends.

CHROME MATE®—The safe, effective and most bioavailable chromium complex. It is a patented, oxygen-coordinated niacin-bound chromium complex clinically proven to promote healthy blood sugar levels and normal body weight, especially in individuals who are diabetic or obese. Importantly, it is clinically proven to reduce body fat while sparing muscle mass. ChromeMate has been shown to be absorbed and retained in tissue at significantly higher levels than other common chromium complexes, including chromium picolinate.

Super CitriMax and ChromeMate are often formulated together as a potent combination for effective weight management and healthy living, underscoring InterHealth's commitment to providing quality, innovative solutions.

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SuperCitrimax. Eat Less. Burn More.

International Dehydrated Foods, Inc.

International Dehydrated Foods, Inc. (IDF™) is a world leader in the development, processing, and distribution of natural meat and poultry-based food ingredients that include spray-dried meat and poultry powders, chicken fat powders, broth powders, powdered combinations of chicken broth and fat, 32% (37 Brix) frozen chicken broth, and shelf-stable liquid chicken fat.

We are excited to introduce five new items to our line up of "*Natural*" products, a Premium Chicken Broth, two Powdered Beef Broths, a Powdered Beef Fat, and a powdered Beef Fat and Broth combination. In addition to our exceptional base broths, we can now offer a Premium Chicken Broth (Item No. 3813), a rich, concentrated, base that has been processed to maximize mouth-feel and chicken flavor. Our two new IDF® Powdered Beef Broths offer two distinct profiles. You can now choose a "fine" tan powder (Item No. 5402) with light roasted notes, or an agglomerated version (Item No. 5403) with an intense/strong roasted note in a rich brown powder form. Our new IDF® Powdered Beef Fat (Item No. 5761) offers a rich cream color, smooth mouth feel, and light roasted beef notes. Our new IDF® Powdered Beef Fat and Broth (Item No. 5760) has a rich bold flavor with a smooth mouth-feel.

Our meat and poultry products have been the preferred choice of food companies focused on providing the consumer with food that truly tastes good. IDF products offer the most flavorful, cost-effective formulations for seasoning blends, flavors, bouillon, soups, sauces, gravies, marinades, batters, breading, stuffing mixes, and snacks.

For further information, contact:
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Web Site: www.idf.com

IDF®

International Fiber Corporation

International Fiber Corporation gives you many ways to improve your products using one of our many fiber ingredients – including Solka-Floc®, JustFiber®, and NutraFiber® brands. International Fiber is also the North American distributor of Fibrex® Sugar Beet Fiber. We can assist you whether you are trying to make a fiber claim, reduce calories, or need the functionality that fiber can offer. Our fibers meet National Formulary (NF) specifications and make excellent excipients and binders for tableting applications. Let International Fiber help you improve your new product success!

For further information, contact:
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50 Bridge Street
North Tonawanda, NY 14120
888-698-1936
716-693-3528
info@ifcfiber.com
www.ifcfiber.com

ifc INTERNATIONAL FIBER CORPORATION
Solutions for a changing marketplace

J Rettenmaier USA

J. Rettenmaier is the Global Leader in the production of insoluble Dietary Fibers.

At this year's IFT in Chicago, JRS emphasized our **Sugarcane** and **Oat Fiber** line that are part of our complete portfolio of **VITACEL®** fibers that also includes **Wheat, Apple, Cellulose, Cottonseed, Bamboo, Orange, MCC and Wheat Fiber Gels.**

Our new State-of-the-Art manufacturing facility in Cedar Rapids, we ensure that our customers have a dependable source of high quality ingredients that have Consumer Preferred Labeling, proven Health Benefits and will contribute to Calorie Reduction.

For immediate assistance with information, samples or to speak with our application specialists, please contact us:

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Website: www.jrsusa.com

JRS

Jon-Lin Joins McCain Foods USA, Inc.

Jon-Lin Joins McCain Foods USA, Inc.

Jon-Lin® Vegetables & Fruit are now backed by McCain Foods – a global leader in premium potatoes, onions and other vegetables. This partnership offers customers the industry-leading products of Jon-Lin, plus the agronomy and technical expertise of McCain.

Jon-Lin NatureSmart™ Vegetables & Fruit deliver the appearance, texture and taste of fresh produce in a consistent and convenient frozen form. Our instantaneous liquid nitrogen freezing creates balanced moisture, which ensures recipe functionality and also locks in the right amount of moisture for the most natural flavor and firmness.

Jon-Lin offers a variety of products – ranging from mushrooms and onions to peppers and pineapple – prepared via four unique cooking processes: caramelizing, sautéing, fire-roasting and smokehouse-roasting. Our products add premium value to a variety of applications, including entrees, soups, pastas, pizzas and omelets.

To request product samples or for more information, please call 1-800-767-7377 or visit www.mccainusa.com/jon-lin.

Jon Lin®

Kalsec®

At this year's IFT show, Kalsec® highlighted onion and garlic extracts and chilli pepper extracts.

Kalsec®'s onion and garlic extracts provide you with a money saving alternative to dehydrated onion and garlic powders. An experienced team of product development and sensory specialists was on hand to demonstrate the complete flavor profile capabilities and to discuss how Kalsec® can work with you to develop customized garlic and/or onion extract(s) that are a flavor match to their dehydrated counterparts.

Kalsec® offers a full range of chilli pepper extracts that deliver consistent and predictable heat. The capsicum demonstration showcased how Kalsec®'s pungency management experience and chilli pepper extract variety can help you deliver just the right kind of heat in your food formulations.

Kalsec® is a privately held producer and marketer of natural extracts for use in food, beverage, and pharmaceutical applications (www.kalsec.com). Selling and marketing in more than 70 countries worldwide, Kalsec® is dedicated to delivering the best products on time, and backed with unparalleled technical expertise.

For further information, contact:
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kalsec®

Kikkoman International Inc.

At Kikkoman, we combine a heritage of more than 300 years of quality and expertise with leading edge production technology to offer food manufacturers a reliable source of premium sauces and ingredients that are made in the USA. From quality soy sauce in liquid and dehydrated forms, to a line of premium sauces—including our authentic Asian sauces, ingredients and seasonings—our products are formulated for consistency and optimal performance in food manufacturing. Whether you need product samples, technical support or a creative partner in new product development, please contact us at **1-415-956-7750** or email **industrial@kikkoman.com**.

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KIKKOMAN

Kraft Food Ingredients

At this year's IFT, Kraft Food Ingredients (KFI) unveiled three new products – Fire Roasted Flavor, Organic Grill Flavor® and Pasteurized Premium Cured® Cheddar Blend.

Falling under KFI's Flavors of Cooking™ line, Fire Roasted Flavor is a versatile, well-balanced, natural flavor that delivers a fatty, savory brown, smoked taste to any application.

Organic Grill Flavor®, an authentic-tasting, natural, charbroiled grill flavor, delivers the charbroiled, savory and smoky notes associated with cooking over charcoal without specialized processing in an organic form. It does not contain hydrogenated oil and is not made with genetically-modified ingredients.

Pasteurized Premium Cured® Cheddar Blend is a high performance cheese blend that yields an authentic balanced aged cheddar profile throughout its shelf life. It provides the same flavor impact as a club cheese, but at a lower usage level and a more favorable cost.

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KRAFT®
KRAFT FOOD INGREDIENTS

Loders Croklaan

At this years IFT show in Chicago, Loders Croklaan, a leading innovator and producer of fats and oils, announces a new line of SansTrans™ called Roll-Rite. They are a trans-free, lamination shortenings that delivers great taste, texture and superior process-ability. The new product line offers several lamination versions for various baking usages such as puff pastries, pies, croissants and danishes. Additional benefits of Roll-Rite include:

- Maintains texture during processing and lamination
- Lamination and sheeting with no dough tearing and increased pliability. Less down time
- Easy to transfer using a fat pump
- Resists work softening
- Water free composition without loss of dough "lift"; eliminates problems associated with emulsion breakdown in high pressure rollers
- Greater performance than more expensive option such as butter

For additional information, please call 800.621.4710 or e-mail sanstrans@croklaan.com.

For further information, contact:
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Web: www.crokaan.com

IOI GROUP
Loders Croklaan

Lonza Inc.

Products: Kosher Non-GMO food emulsifiers, glycerol and polyglycerol esters, sorbitan esters and polysorbates, along with blends tailored to specific market needs. Lonza also offers nutritional products such as FiberAid® prebiotic, Niacin/Niacinamide, as well as Carnipure™ crystalline (GRAS) and Carnipure™ tartrate (GRAS; U.S. Patent 5,073,376 and other international patents).

Description: Lonza produces a broad range of emulsifiers and additives for food applications. Lonza has the flexibility to meet emerging customer needs including offering Kosher, non-GMO emulsifiers, unique custom reactions and specialty lipid products.

FiberAid® prebiotic is , a naturally occurring water soluble polysaccharide. , is a prebiotic fiber. It is the solution for food manufacturers who not only want to add nutritionally significant amounts of dietary fiber to their functional foods and beverages without jeopardizing taste, color, aroma or mouthfeel, but seek to offer products with digestive health benefits. FiberAid® prebiotic is produced exclusively by Lonza using a patented water-based, solvent-free manufacturing process. FiberAid® prebiotic is certified Kosher and GRAS affirmed for foods and dietary supplements without limitations.

Carnipure™ crystalline and Carnipure™ tartrate from Lonza are GRAS for use in certain conventional foods as a dietary source of L-Carnitine. This vitamin-like substance enables the generation of energy from fat.

Lonza is also the leading producer of niacin for food fortification and animal feed, multivitamin supplementation and pharmaceutical applications. Niacin is used to help maintain LDL, HDL and triglycerides and plays a critical role in protein, fat and carbohydrate metabolism.

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www.lonza.com
www.carnipure.com

Lonza

LycoRed Corp.

At this year's IFT, LycoRed showcased two great-tasting new platforms for the delivery of the antioxidant health benefits of carotenoids. These platforms, ***Tomato on the Go*** and ***Summer Delight***, are fortified with BLT — a cold water dispersible, ready-to-use formulation of natural beta carotene from Lyc-O-Beta, lutein from Lyc-O-Lutein and tomato lycopene from Lyc-O-Mato® Red.

The rich savory flavor of ***Tomato on the Go*** is enhanced with LycoRed's CTC (clear tomato concentrate). This full and flavorful beverage is a great way to supplement a breakfast on the run, and also provides a heart-healthy, satisfying mid-day snack. The light, yet sweet taste of fruity ***Summer Delight*** is a great treat for kids and a refreshing after-sports beverage during all four seasons of the year.

LycoRed specializes in simplifying the development and production process by combining full-service support with innovative technology, and by providing creative solutions to food and beverage fortification challenges.

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LYCORED
Creating innovative nutrition

McClancy Seasoning Company

For more than 60 years, McClancy Seasoning, a fully integrated flavor and food development company, has been working to develop creative culinary solutions that streamline operations.

From creating innovative seasoning solutions, to working directly with concept formation, McClancy's research and development professionals design flavors and items that drive repeat business. McClancy Seasoning brings an extensive product line, while customizing to the flavor and preparation size that fits their clients, not one-size-fits-all.

Custom blending and packaging capabilities are available from 1 gram to 2,000-pound tote bags for industrial applications so you can enjoy consistent production and right-on-time delivery.

McClancy offers exceptional R&D support for your product development, manufacturing operations and brand strategy.

R&D Categories
- New product development
- Line extensions
- Product enhancement
- Processing improvement
- Processing characteristic enhancement
- Shelf-life enhancement
- Co-packing opportunities

Our flavor engineers solve problems and create new opportunities for our valued clients every day. We work with you to create exciting and distinctive new flavors – and make sure those flavors can be reproduced efficiently and consistently every time.

For further information, contact:
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www.mcclancy.com

McClancy Seasoning Co.
So much more than just seasonings.

Moody Dunbar, Inc.

For 75 years Moody Dunbar, Inc. has been driven by the principles of safety, quality and dependability. This family-owned and operated business is America's largest processor of bell peppers, pimientos and roasted peppers. Dunbar ingredients are found in hundreds of products of America's largest food companies.

With proprietary seed stocks and acreage contracted only for processing, our bell peppers and pimientos are consistently superior in color, texture and flavor. Our roasted peppers are produced with a live flame-roasting process that yields a unique and unmatched flavor. Our products are produced in a wide variety of styles and cuts including diced, strips and purees. Packages include sizes ranging from 15 oz. cans to 55-gallon drums.

Our products are processes in state-of-the-art facilities and all are grown and processed in the United States. Our facilities are regularly inspected by various governmental and third party auditors. We regularly score "Superior" on these audits. We have in place a fully audited "Sustainable Agriculture" program.

Peppers, pimientos and roasted peppers are an ideal way to upscale a wide variety of foods such as soups, meats, dips, salsas, frozen entrees and refrigerated salads. Set your creations apart from your competitors by choosing Moody Dunbar, Inc. products.

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Web: www.moodydunbar.com

National Starch Food Innovation

National Starch Food Innovation has the experience, the expertise and the resources to develop application-specific answers for consumer food products. Our expertise covers core attributes, like starch technology, processing tolerance, shelf life and rheology optimization and also today's most pressing issues like flavor, texture modification, mouthfeel, natural and organic formulations and nutrition content.

Texture Innovation: Through consumer and customer researcher, we've learned that "Texture changes everything" when it comes to introducing new products. Our experience, science base and sensory skills can help food formulators determine the right combination of ingredients to deliver specific textures that consumers crave and also help them achieve differentiation in their offerings. And our new Center for Texture Excellence will enable processors to develop and bring to market more exciting textures at a faster pace. Example: new N-DULGE™ co-texturizers for dairy products.

Wholesome Foods: National Starch Food Innovation is driving the development of new technology and ingredients that support the trend towards more natural, wholesome food products that, at the same time, deliver home-made or culinary experiences consumers expect. Examples: NOVATION® organic functional native starches; HOMECRAFT® functional flours.

Nutrition and Wellness: One of our goals at National Starch Food Innovation is to develop and commercialize ingredients that deliver health benefits, like those from fiber enrichment and whole grains, through traditional foods and beverages to help consumers' improve the nutritional content of their diets. Our most recent examples: Hi-maize® whole grain corn flour; NUTRIOSE® soluble fiber.

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www.foodinnovation.com

National Starch FOOD INNOVATION

Newly Weds® Foods

All the Ingredients of a World Leader.

In the food processing and foodservice industries, Newly Weds® Foods is recognized as a premier global source for Customized Taste Technology. Whether you're developing products for retail or foodservice, you'll find our resources are one of a kind.

At Newly Weds® Foods, we use FlavorTrak℠, the most comprehensive menu-tracking database in the world, helping our customers stay on top of and ahead of emerging trends.

A classically trained Culinary Staff is another ingredient in the signature formulations Newly Weds® Foods creates. "Gold Standard" signature recipes set the benchmark for our Food Technologists, a group of formulation professionals uniquely skilled in food science.

You can count on Newly Weds® Foods' Technical Service Experts to be at your site for startups, technical assistance, troubleshooting or plant audits. Plus, we will conduct personalized seminars regarding our products and associated processes, free of charge, at your location or ours.

With 16 state-of-the-art plants and 12 regional laboratories, Newly Weds® Foods has the global reach to address any processors or foodservice operation's needs. Whether you need custom formulated seasonings, capsicums, marinades or breadings and batters, the food industry's #1 source for food coating solutions is Newly Weds® Foods.

For further information, contact:
http://www.newlywedsfoods.com
or call 1-800-621-7521.

NEWLY WEDS® FOODS
CUSTOMIZED TASTE TECHNOLOGY
1-800-621-7521

OmegaPure®

OmegaPure® is North Americas only vertically integrated omega-3 long chain fatty acid processing company. We manage our ingredients from harvest to production through our company owned vessels and processing facilities.

OmegaPure ingredients are produced from highly refined and deodorized menhaden fish oil from the Atlantic Ocean. The menhaden is a herring-like fish. We harvest the fish off the Atlantic & Gulf Coast of the USA. OmegaPure manages the fish harvest as established by the Atlantic State Marine Fishery guidelines. This enables us to insure the menhaden population will remain healthy, renewable and sustainable.

OmegaPure's oil contains the essential long-chain omega-3 fatty acids EPA and DHA. Our omega-3 ingredients provide a clean label for food product formulations. OmegaPure ingredients perform well in many food products. Fortified products with OmegaPure ingredients include baked goods, sauces, spreads, dressings, desserts, dairy and medicinal food applications.

OmegaPure®
Healthy Products for a Healthy World®

ORAFTI

The latest IFT represented another success story for ORAFTI, the world's leading producer of prebiotics for the food and beverage industries. Prebiotic products featured included cookies and bars, soy beverages, a selection of Stonyfield Farm® yogurts, fruit preparations, and smoothies, along with Beneo™ H_2O, nutritionally enhanced water. ORAFTI's booth featured three information stations; each examining the benefits of Beneo™ prebiotics for a specific age group. For infants, benefits begin with a reduced risk of infant diarrhea, constipation and intestinal infections, as well as moderation of symptoms such as vomiting and fevers – benefits that every child and every parent can appreciate. In adults, the clinically proven advantages of a diet including Beneo™ center on improved digestive function. For seniors, Beneo™ synbiotic nutrition may help reverse signs of digestive aging as we get older, as well as improvement in overall intestinal function. According to Joseph O'Neill, Executive Vice President of Sales and Marketing for ORAFTI in North America, "All these benefits areas represent potential new structure-function label claims in US markets. The technical and scientific knowledge we extend to our customers along with innovative new products and marketing expertise completes the picture."

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For more press information:
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P&G Food Ingredients

At this year's IFT, P&G Food Ingredients distributed great tasting chocolate chip cookies made with Olean® brand shortening, a zero calorie, zero trans-fat, zero saturated fat, zero cholesterol alternative to traditional fat. The cookies contained just 92 calories and three grams of fat – reducing the fat by 53% and calories by 26%.

Olean shortening has been formulated for use in cookies and is an ingredient enabling products to have the same great taste and texture of regular snacks and cookies without the added fat, calories and cholesterol of regular fat.

Olean samples are available for your development projects and it is approved for use in savory snacks, ready to heat popcorn and cookies.

P&G Food Ingredients also introduced Omegaphyl™ concentrated omega-3 fatty acids. Low odor, clean tasting Omegaphyl offers a breakthrough in delivering these nutritionally important fatty acids in great tasting foods.

Olean and Omegaphyl are just part of P&G Food Ingredients' line of functional ingredients which allows formulators to create great tasting, better-for-you products with true benefits.

For product specifications, samples or questions, please call P&G Food Ingredients at (800)-477-8899 or visit www.olean.com.

Healthier choices never tasted so good!

P.L. Thomas

P.L. Thomas – Where Food and Health Meet™
PLT highlights specialty carrageenans and cutting-edge ingredients for functional foods and beverages.

- ***CEAMBLOOM***™ from CEAMSA–specialty carrageenan Kosher gelatin replacement.
- **Kaneka Q10**™ - the only self-affirmed GRAS Coenzyme made through a natural yeast fermentation process.
- **Lipogen Phosphatidylserine (PS)** self-affirmed GRAS for improved cognitive health.
- **PomegranateP40*p***™ from Polinat, rich with 40% punicosides, is Kosher-certified
- **Tomat-O-Red®** - Natural colorant and fortification made from lycopene.
- **Mena7™ natural Vitamin K2** for bone health and cardiovascular health! Vitamin K2 activates proteins that are necessary to put calcium in the bones and keep it out of the arteries. It is a perfect choice for enrichment and functional foods.

Depend on PLT for your specialty ingredients needs.
www.plthomas.com
plt@plthomas.com

For further information, contact:
Paula Nürnberger
paulan@plthomas.com
973-984-0900x214

plt p.l. thomas

Pharmachem

Pharmachem Laboratories, Inc., is a family of companies specializing in manufacturing and value-added processing of custom ingredient systems for food, beverage, flavor, fragrance and dietary supplement customers since 1978. We are NOP Certified Organic since 2002.

We have 10 manufacturing facilities in the USA offering vertically integrated enzymatic, thermal and mechanical processing technologies, from benchtop to commercialization.

Core processing capabilities include; encapsulation, extraction, concentration, purification and recovery, distillation, clarification, granulation, agglomeration, microparticulation, spray drying, spray-chilling, fermentation, heavy-duty blending, wet and dry blending and more.

We offer soluble premixes, claim-specific fortifications, concentrated dairy flavors, and application-specific solutions.

Whether it is a healthy ingredient system, a standardized plant extract, a concentrated dairy flavor or a process problem you just can't figure out, Pharmachem has the technology and talent to help you succeed in the food & beverage marketplace.

We have been over 30 years experience with health & wellness solutions.

We make ingredients work™.

For further information, contact:
Pharmachem Laboratories, Inc.
201-719-7405 | 800-526-0609
food@pharmachemlabs.com
www.pharmachemlabs.com

USDA ORGANIC

"We Make Ingredients Work"™

Puratos

A Flavour of Puratos

Trying to get the most out of their busy lives, enjoying and sharing delicious and healthy food, discovering new tastes and keen to experience different sensations—these are some of the characteristic traits of the ever-demanding consumers that Puratos and our customers must attract and delight. Whether it is in the arena of health, pleasure or convenience, new concepts and innovative ideas are the only means to attract and retain these consumers of today.

For nearly a century, we have introduced countless innovations which have helped bakers turn their passion into an enjoyable and profitable profession reality. Be it emulsifiers, enzymes, sourdoughs, improvers, dough conditioners or yeasts, Puratos masters all these technologies.

Our PatisFrance range of fine French pastry products offers carefully selected ingredients which, above all, are easy to use, premium in quality, filled with pleasure and differentiated from the ordinary.

Puratos also offers a wide palette of couverture chocolate and chocolate products. Famous for their exceptional taste and quality, Belcolade chocolate meets and exceeds all professional expectations. Our range includes classical couverture chocolate, compounds, creams, nut fillings and origin based products.

Puratos - your reliable partners in innovation.

For further information, contact:
Puratos US Corporate Headquarters
1941 Old Cuthbert Road
Cherry Hill, NJ 08034
Phone: 856-428-4300 or 800-654-0036
Fax: 856-428-2939
E-mail: infous@puratos.com
Website: www.puratos.us

Puratos
Reliable partners in innovation

Rivland Partnership

Rivland Partnership is a joint venture between Riviana Foods Inc. and Riceland Foods Inc. Rivland has earned a reputation for dependable service and consistent quality rice flour. Supported by both Riviana and Riceland's technical teams, Rivland's commitment to quality is unsurpassed in the rice industry.

Rice Flour RL-100
Rice Flour RL-100 is a "general purpose" white rice flour produced from long grain varieties of rice. It performs well in a variety of applications, and has proven especially good in extrusion processes. Rice Flour RL-100 is ideally suited for food applications where minimal flavor interference is preferred, or where a dry texture or crispness is desired.

Parboiled Brown Rice Flour
Rivland Brown rice Flour is produced from parboiled long grain varieties of rice. Because it includes the bran layer of the rice grain, Parboiled Brown Rice Flour has a rich, nutty flavor and higher nutritional values than white rice flour.

Rice-Gel® L-100
Rice-Gel® L-100 is a specially processed, precooked rice flour. It is extremely bland, with a clean taste & virtually no noticeable cereal flavor. Rice-Gel® L-100 blends readily with other dry ingredients, particularly good for flavored popcorn and baked or extruded snack dustings.

Contact us for assistance with your rice flour needs.
PHONE 713-529-3251
FAX 713-529-1661
WWW.RIVLAND.COM

RIVLAND
Rivland Partnership

ROQUETTE America, Inc.

ROQUETTE, a leading global manufacturer of healthy ingredients, showcased Smart Calories™ solutions for nutrition bars, extruded snacks, frozen desserts and confectionery. Smart Calories™ solutions provide our customers with nutritionally balanced, great tasting choices for consumers featuring NUTRALYS® all natural, non allergenic pea protein, NUTRIOSE® soluble fiber, MALTISORB® rystalline maltitol, and POLYSORB® FM fiber enhanced maltitol syrup. NUTRALYS®, a functional vegetable protein with outstanding nutritional benefits can be used in extruded snacks and nutrition bars. MALTISORB® maltitol is used in formulations to easily replace sucrose, is low in calories and contributes to glycemic control. NUTRIOSE® soluble fiber adds fiber and reduces sugar in confectionery and nutrition bars.

POLYSORB® FM, maltitol syrups are designed for use in frozen desserts and offers indulgent taste with the benefits of added fiber, and caloric and sugar reduction. Our ingredients can be used in "healthy-for-you" formulations for nutrition bars, extruded snacks, chocolates, confectionery and frozen desserts.

For further information, contact:
ROQUETTE America, Inc.
1417 Exchange Street
Keokuk IA 52632
800-553-7035
www.roquette.com
rai.sales@roquette.com

ROQUETTE

Sargento Food Ingredients

Sargento Food Ingredients has developed a unique way to bring sauce to your refrigerated products—Custom Melts™. Added to a meal kit or side dish, fresh tasting Custom Melts™ turn into sauces in moments, making an ordinary dish, extraordinary.

Sargento Custom Melts™ are made using a patented technology that is totally customizable, so they deliver the form, flavor and functionality your application demands. With excellent cling, intense flavor and a cleaner dispensability than ready-made sauces, Custom Melts™ make saucing a dish simple. These high quality sauces come in just about any refrigerated form you can think of—shreds, dices, cubes or slices. Custom Melts™ turn into flavorful sauces within a few moments of heating.

A creamy and delicious addition to vegetables, side dishes or meal kits, Custom Melts™ are available in more than a dozen varieties including—Garlic-Herb, Sharp Cheddar, Alfredo, Pepper Jack, Creamy Pesto and Country Gravy. To find out more about this revolutionary product, go to www.sargentofoodingredients.com and click on Custom Melts™.

For further information, contact:
Sargento Food Ingredients
One Persnickety Place
Plymouth, WI 53073
800/795-7090

SARGENTO
Our Family's Passion is Cheese.

Sensient Colors Inc.

At this year's IFT, Sensient Colors introduced **Spectracoat™ Pearl**, utilizing **SensiPearl™** pigments. This new, novel technology helps companies create differentiation by bringing luster effects and iridescent shimmer to their products. The pre-dispersed, one-step, one–application product also helps provide a cost effective application technology for pigment coatings by eliminating the need to install expensive spray equipment. Unlike dry pigments, **Spectracoat™ Pearl** also eliminates environmental and housekeeping issues associated with nuisance dust.

Sensient Colors, as a market leader, answers the growing demand for health and wellness positioned products through expansion of its natural and organic capabilities. Some of Sensient's new organic offerings shown at IFT this year include: Purple Sweet Potato, Caramel, Beet Powder and Beet Juice.

For product information or samples, please contact the Sensient Colors Innovation Lab at 800-325-8110, or email at scinfo@sensient-tech.com.

For further information, contact:
Sensient Colors Inc.
Color Innovation Lab
2515 N. Jefferson Ave.
St. Louis, MO 63106
314-889-7600
800-325-8110
314-658-7314
scinfo@sensient-tech.com

SENSIENT

Sethness Products Company

In business since 1880, Sethness Products Company is the world's leading manufacturer of Caramel Color. Used in virtually every segment of the food industry, Sethness Caramel Color applications include beverage, baked goods, candy, sauces, soups, cereals, dry mixes and pet foods.

Available in both liquid and spray-dried powder specifications, the product line includes more than 50 liquid and 20 powdered Caramel Colors. Sethness also offers 3 Caramelized Sugar Syrups, Low-Sulfite, GMO-free, and Certified Organic Caramel Colors.

Sethness has recently enhanced their Web site to include specific technical recommendations for a wide variety of applications; and has also posted an updated General Product Description Sheet for both Liquid and Powdered Caramel Colors.

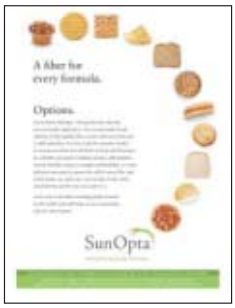
Sethness operates the world's largest Caramel Color production facility in Clinton, Iowa, as well as plants in Ahmedabad, India and Merville, France. These operations allow Sethness to offer Caramel Color solutions and service to food processors around the globe.

For further information, contact:
Sethness Products Company
3422 W. Touhy Avenue
Lincolnwood, Illinois 60712
Toll Free: 888.772.1880
mail@sethness.com
www.sethness.com

SETHNESS CARAMEL COLOR

SunOpta Ingredients Group

SunOpta Ingredients showcased their fiber and bran products in healthy snacks and "any time of day" breakfast foods at this year's IFT Food Expo. Attendees sampled fiber-enriched foods including Whole Wheat Crackers, Gluten-free Shortbread Cookies, Blueberry Pomegranate Açai Yogurt Dip, Hummus Dip, Apricot Mango Fruit Smoothies, Cranberry Bran Muffin Tops, French Toast Sticks, and Sausage Patties.



Products: World's largest producer of Oat Fiber. Also offers Other Fibers (Soy/Organic), Stabilized Brans (Oat/Wheat/Corn), Stabilized Wheat Germ, Cellulose Gel, Ingredient Systems, Specialty Starches, Acid Whey, and Dry Sweeteners (Honey/Molasses). In addition we offer a broad range of Contract Manufacturing Services (Dry Blending, Evaporation, Fermentation, Grinding, Instantizing, Liquid Mixing & Processing, and Separation & Filtration).

Applications:
Fibers (Oat/Soy/Organic): Very versatile ingredients that can enhance food and beverage products by adding additional nutritional and functional benefits.
Stabilized Brans (Oat/Wheat/Corn): Extend pre-bake shelf life, reduce calorie content, enrich nutritional content.
Wheat Germ: Ideal for Whole Grain and Fiber enriched foods/beverages.
Ingredient Systems: Our specialty starches and stabilizers provide excellent functionality in dairy/non-dairy (soy, rice) based products.
Dry Sweeteners (Honey/Molasses): For various foods.
Grade A Acid Whey: Add acidic flavor notes in a cost effective whey form.
Cellulose Gel: Improve texture, mouth feel and freeze/thaw stability.

For further information, contact:
Customer Service
SunOpta Ingredients Group
25 Wiggins Avenue
Bedford, MA 01730
Toll Free: 1.800.353.6782
Tel: 1.781.276.5100
Fax: 1.781.276.5125
SOICustomerService@SunOpta.com
Website: www.sunopta.com

SunOpta
Ingredients Group

Tetra Pak Inc.

Tetra Pak protects what's good™.
Tetra Pak is focused on providing food and beverage manufacturers with customized, comprehensive processing and packaging solutions, including processing and filling equipment, plant automation and a large variety of packaging systems and secondary packaging solutions. This approach allows Tetra Pak to truly be the company that "protects what's good."
For more information, visit www.tetrapakusa.com.

For further information, contact:
Tetra Pak Inc.
101 Corporate Woods Parkway, Vernon Hills, IL 60061
Phone: (847) 955-6000
Fax: 847-955-6500
Contact: Giovanna Prestes
Email: giovanna.prestes@tetrapak.com
www.tetrapakusa.com

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Ventura Foods, LLC

Ventura Foods, LLC produces shortenings, oils, butter blends, margarines and spray releases. Our range of products include: flavored oils, liquid and solid fats, special functional needs products, No Trans products and customized formulations. We also offer a full line of dressings, sauces and mayonnaise to the food manufacturing sector. All of our products can be custom developed and designed to meet a wide array of functional needs. Products can be developed for shelf-stable, frozen or refrigerated applications.

We offer a diverse selection of packing options from: various portion cup sizes (round and rectangular), pouch packs in various sizes, 50 lb cubes to 2200 lb bulk totes, and some bulk tank trucks. We can also customize these packaging options for your specific needs. Along with our customized development, we can also offer logistical flexibility with our 12 manufacturing facilities in key geographical locations around the United States. Customizing products for your specific needs is what we do best.

Our current focus is reviewing our best options for No Trans products such as the unique source oils, types of fats and processes, solutions by applications, specialized processing to meet functional requirements, and creating a wide variety of liquid, pumpable (semi-fluid), and solid products for shortenings, oils, butter blends and margarines to meet customer needs and requirements. We have recently developed several products that meet the no trans qualification and have reduced saturated fats. All Ventura Foods, LLC plants are OU Kosher, follow GMP guidelines and our products are produced under strict good manufacturing practices. We also rely on independent outside firms such as Cook & Thurber, Silliker Labs, AIB and NFPA to audit our facilities.

For more information please contact us at 800-326-2253 or you can look at our Web site at www.venturafoods.com. We've got you covered from…Coast to Coast.

For further information, contact:
Ventura Foods, LLC
800.326.2253
www.venturafoods.com

Ventura Foods, LLC

Virginia Dare

America has many great regional food tastes and cuisines. Americans are looking for products that also provide them with health and wellness. Virginia Dare demonstrated how the Great Tastes of America could be incorporated into both products for health and wellness as well as indulgence. Virginia Dare offered a variety of exciting taste experiences from diverse regions of the United States under the theme "Great Tastes of America" at IFT Food Expo 2007. Offered for sampling, demonstrating regional tastes, were Pennsylvania Dutch Snicker Doodle Healthy Cereal Bars, New England Maple Healthy Baked Snacks, Sweet Potato Pie Soy Smoothie and Southern Style Sweet Tea. An old fashion ice cream bar featured Ice Cream Parlor Vanilla Ice Cream with toppings such as Peach Cobbler and Blueberry Pie. The results of a recent consumer insights survey were revealed at the booth.

Virginia Dare is a leading manufacturer of premium Vanilla, Tea, Coffee and Cocoa Extracts and Concentrates as well as a uniquely varied line of Flavors for natural, organic and health and wellness foods and beverages.

For further information, contact:
Virginia Dare
Think of us as Flavor
718/788-1776
718/768-3978 fax
flavorinfo@virginiadare.com
www.virginiadare.com

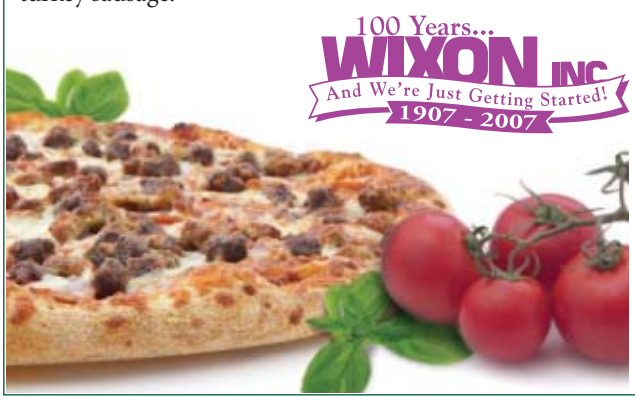
VIRGINIA DARE
Think of us as Flavor

Wixon

WIXON IS MAKING BETTER-FOR-YOU PRODUCTS TASTE DELICIOUS

Wixon celebrated its 100th anniversary with "Perfect" and "Better-for-You" selections at IFT.

Wixon's **"Perfect" pizza** contained KCLean Salt™, which delivers the flavor of salt with half the sodium, and reduced-sodium cheese, sausage, crust, its proprietary blend of spices and seasonings, and Wixon's own organic, low-sodium turkey sausage.



"Perfect" mini cupcakes were made with Magnifique Sweet Lift (enhances sweetness perception), Magnifique SugarLift (enhances sweetness perception in beverages & desserts), Magnifique Mouthfeel (creates the perception of creaminess in reduced-fat and no-fat products), and KCLean Salt, and contained half the sodium, less sugar, and less fat than a leading national brand.

The **KCLean Salt Potato Chip Challenge** was a taste test of chips made with and without KCLean Salt.

Wixon also showcased its **reduced-sodium, organic turkey breakfast sausage** and its **reduced-sugar, lime-flavored water.**

For more information visit www.Wixon.com, or call 800-841-5304.

Yamasa Corporation

Flavor innovation tools at work: Yamasa Soy Sauce and Teriyaki Sauces are available in traditional, less-salt, preservative-free, and in powder form.

OUR PROMISE TO YOU
Yamasa Corporation USA works with Food Manufacturers to create the winning flavor-packed formulas for the food industry. Our customers come to us with general and specific flavor profile needs. We can work with you to produce flavor profiles that exceed expectations and create excitement. When you come to us for flavor assistance we will always make sure to focus on your specific formulation needs.

Now the company that has consistently provided the highest quality flavor enhancement is ready to show you that Innovation is at your fingertips. Yamasa Soy Sauce based products offer richness in flavor.

Reach deep into the past, and let Yamasa put the flavor in today's and tomorrow's best recipes and processed foods.

For further information, contact:
Yamasa Corporation
Masahiro Abe
3480 Torrance Blvd., Ste. 226
Torrance, CA 90503
Phone: 310.944.3883
Fax: 310.944.3935
www.yamasausa.com

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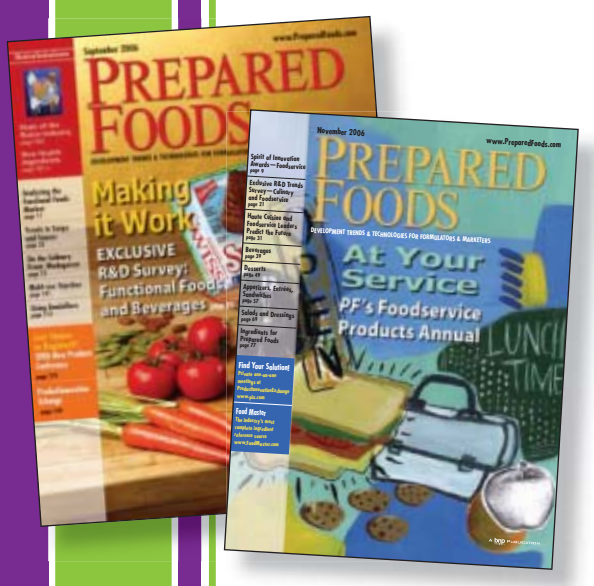

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PREPARED FOODS

Web Locator

American Egg Board

www.aeb.org

Did you know that eggs can perform more than 20 distinct functions in the making and processing of food? In fact, polyfunctional eggs can leaven, bind, thicken, moisturize, dry, flavor, glaze, clarify, emulsify, retard crystallization, garnish, color and add nutrients to your formulations. In addition to improving the performance of baked foods and other food products, eggs can replace many additives on the food label, naturally. To find out more visit **www.aeb.org/EggProducts/** For more information contact: Elisa Maloberti, Director Egg Products Marketing, 1460 Renaissance Drive, Park Ridge, IL 60068-1340; 847.296.7043; Email: aeb@aeb.org.

D.D. Williamson

www.ddwilliamson.com

D.D. Williamson, the world leader in caramel color, now offers a broad spectrum of natural colors. A trusted and recognized provider of color solutions to the food and beverage industry, the company operates nine manufacturing sites on five continents. D.D. Williamson, 1901 Payne St., Louisville, KY 40206. Tel: 502-895-2438. Email: info@ddwmson.com.

The Food Source

www.foodsourceinc.com

Just Pick and Click... Sample Express is coming soon. Put foodsourceinc.com into your favorites now and become hooked on fast samples, great service, GRADE 1 quality and the most competitive prices. And, you'll love our new and improved site, with new lines, new GRADE 1 products, and news you can use with updates on crops, markets and pricing trends. **Go to** www.foodsourceinc.com and **Sample Express**.

G. C. HAHN & Co.

http://www.gchahn.com

G. C. HAHN & Co. – manufacturer and global supplier of customized food stabilizer systems for nearly every food area. We provide you with great product ideas, customized product development and professional technology support. Well-known as a time and cost saver, we deliver robust solutions for even the most demanding stability profiles. G. C. HAHN & Co. USA, Inc., 10505 Corporate Drive, Suite 201, Pleasant Prairie, WI 53158. Office (262) 857 3527, Fax (262) 857 3078. info@gchahn.com.

Gum Technology Corporation

www.gumtech.com

Discover why gums are good and how they can improve your product. Request a sample, problem solve, or learn more about Gum Technology's full range of synergistic blends and individual gums such as Gum Arabic, Agar, Alginates, Carrageenans, Cellulose, CMC, Guar, Konjac, Locust Bean Gum, Pectin, Tara, Tragacanth & Xanthan. Gum Technology Corporation, 509 W. Wetmore Road, Tucson, AZ 85705; 1-800-369-4867.

How do you drive traffic to your web site?

In the *Prepared Foods* Web Locator section!

Contact Christin Schrei @ (231) 487-0400 or schreic@bnpmedia.com for more information.

HunterLab

www.hunterlab.com

We Make Measuring Color Easy For You

From inspection and grading of raw materials to monitoring color consistency of final product - HunterLab provides bench-top, portable and on-line color measurement systems for the food industry. Accurately measure the color of food products in solid, granular, flake, powder, paste and liquid form. Tel (703) 471-6870, info@hunterlab.com

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Contact Christin Schrei @ (231) 487-0400 or schreic@bnpmedia.com for more information.

IDF™

www.idf.com

International Dehydrated Foods, Inc. (IDF™) is a world leader in the development, processing, and distribution of natural meat and poultry-based food ingredients that include spray-dried meat and poultry powders, chicken fat powders, broth powders, powdered combinations of chicken broth and fat, 32% (37 Brix) frozen chicken broth, and shelf-stable liquid chicken fat. International Dehydrated Foods, Inc., P.O. Box 10347, Springfield, MO 65808. Phone: 417-881-7820

Web Locator

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Contact Christin Schrei

@ (231) 487-0400

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for more information.

Ingredients Solutions, Inc.

www.isinc.to

Ingredients Solutions, Inc. "The World's Largest Independent Supplier of Carrageenan" offers a full range of cost-effective carrageenans (Natural and Organic) for meat and poultry applications. From cooked deli slices to marinated case-ready whole pieces, ISI provides the yield improvement and texture control you need. ISI offers full technical support from our R&D facility in Maine. Visit us at the World Wide Food Expo in Chicago (booth S3140) from October 24 - 27 for innovative formulation solutions.

Jungbunzlauer

www.jungbunzlauer.com

sub4salt helps to reduce sodium without compromising product quality. It is a new, patent-pending mineral salts blend which can reduce the sodium content by 25-50% while achieving identical taste profiles in final products.
Compared to other sodium reduction systems, sub4salt offers:

- similar sensory characteristics to NaCl
- no metallic KCl taste
- similar usage and handling to NaCl

For further information and application data please contact: Jungbunzlauer, John Hadley, john.hadley@jungbunzlauer.com, (617)614-0225

Milei

www.milei.de

Milei is dedicated to innovation and service. The Company is a leader in whey components technology and offers various whey and milk products/fractions tailor made to meet each customers needs. Milei is located in the Bavarian region of the German dairy industry and this location allows them to receive and process the freshest raw materials. (614) 764-1236, (614) 764-1216 (fax), Email: dsibrown@aol.com.

Sargento Food Ingredients

www.sargentofoodingredients.com

Sargento Food Ingredients is a unit of family-owned Sargento Foods. It produces custom cheese products for the food industry. These include portion-control shredded cheese and cheese sauces, as well as sliced and diced natural and processed cheese. Watch an exciting video demonstration of the division's newest product—Custom Melts™—featuring Sargento Corporate Chef Guy Beardsmore. Sargento Food Ingredients, One Persnickety Place, Plymouth, WI 53073; 800/795-7090

Tragon Corporation

www.tragon.com

Tragon is not a cookie cutter marketing research company. We meet each product development and marketing challenge with a unique solution that combines our expertise in consumer behavior, sensory science, product marketing and statistics with an array of integrated marketing research tools. Tragon Corporation, Brian McDermott, 650-365-1833.

Tree Top, Inc.

www.treetop.com

Tree Top's mandate to its 1,700 grower-owners is to process their fruit into the highest quality, value-added products in the industry. Beyond premium apple juices, the company's ingredient group produces and sells a wide variety of bulk dried, chilled, frozen apple and frozen cherry products, as well as specialty juice concentrates. Tree Top, Inc., P.O. Box 248, 220 E. Second Ave., Selah, WA 98942-0248. Phone: 800-367-6571, Ext. 1435; Fax: 509-698-1409

How do you drive traffic to your web site?

In the *Prepared Foods* Web Locator section!

Contact Christin Schrei

@ (231) 487-0400

or schreic@bnpmedia.com

for more information.

WILD Flavors, Inc.

www.wildflavors.com

WILD Flavors, Inc. delivers flavors, colors, ingredients and process technology to the food and beverage industries. Along with this expertise, WILD Flavors, Inc. is your one-stop-shop from concept development through raw material procurement to plant design and support, complete with packaging equipment. Find out what WILD can do for YOU! Visit www.wildflavors.com or call (859) 342-3600.

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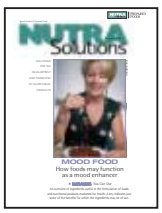

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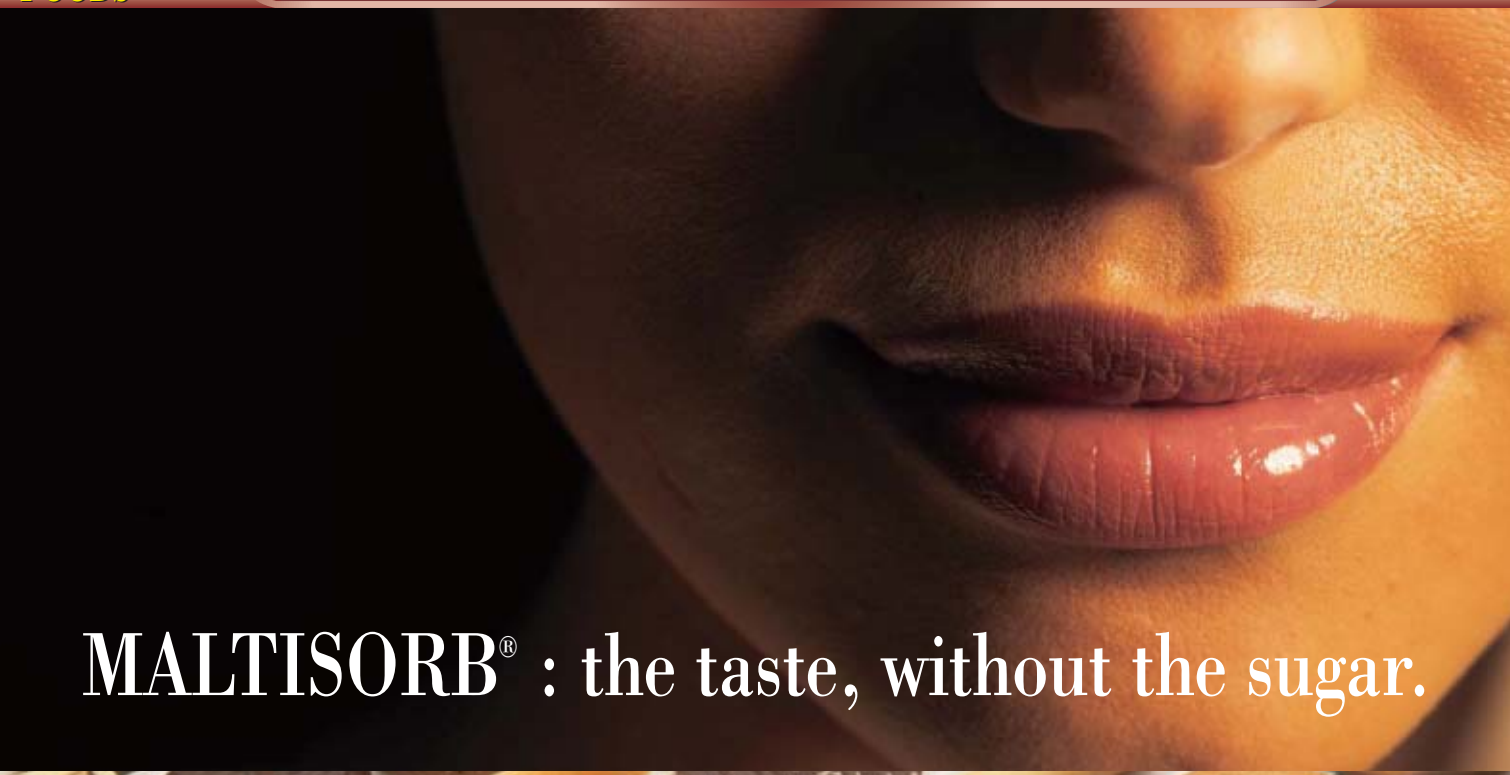

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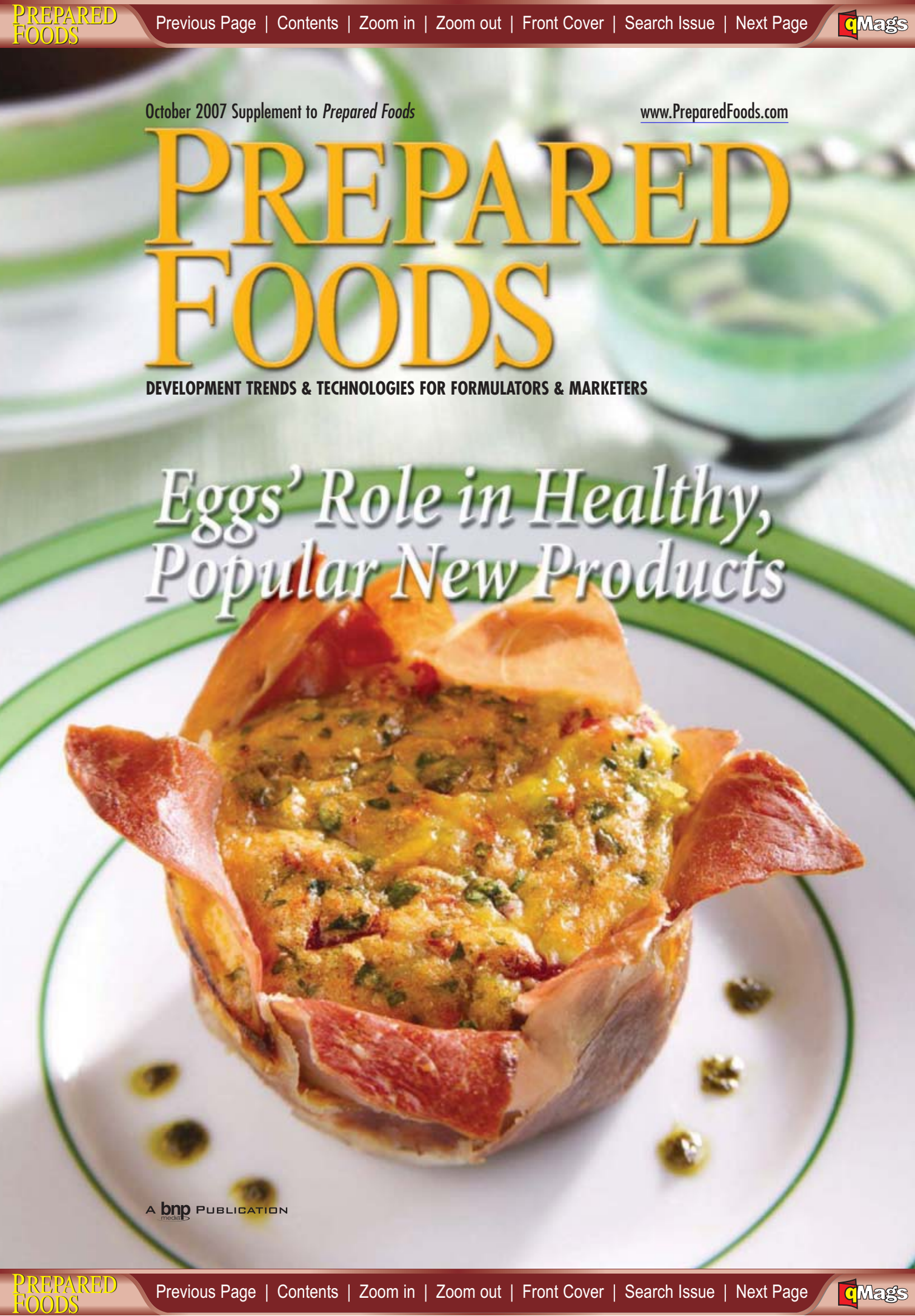
Eggs' Role in Healthy, Popular New Products



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Eggs' Role in Healthy, Popular New Products

By Ann Przybyla Wilkes

The versatility of eggs, a wholesome ingredient that provides a wide range of benefits in product formulations, has led to their use in a variety of new products, from indulgent foods to sports enhancement products. The American Egg Board (AEB) provides a wealth of information for food manufacturers, product developers and marketers on the benefits, functionality and nutrition of egg products on its website at www.aeb.org/EggProducts.

Egg products perform multiple functions in food products and help keep ingredient statements short and clean. The appeal of eggs as an ingredient is boosted further by the fact that they are virtually trans fat free. Since 100g of eggs have less than 0.5g trans fats, food products incorporating eggs do not have to list trans fats on the ingredient statement, if the other ingredients do not contribute trans fats.

Eggs have a high nutrient density since they provide excellent protein and a wide range of vitamins and minerals in proportion to their calorie level. Protein quality can be measured in a number of ways. Protein Digestibility Corrected Amino Acid Score (PDCAAS) is a method of evaluating the protein quality based on the amino acid requirements of humans. The U.S. Food and Drug Administration (FDA) and the Food and Agricultural Organization of the United Nations/World Health Organization (FAO/WHO) consider PDCAAS the preferred method to determine protein quality in human nutrition. The PDCASS for whey, eggs and casein is 1.0.

Another method used to rate the quality of protein is Amino Acid Score (AAS). This measures the essential amino acids present in a protein and compares the values with a reference protein. The amino acid score reflects the most limiting essential amino acid. Whole eggs have an AAS of 1.21, compared to 1.14 for whey protein, 1.00 for casein, 0.99 for soy protein concentrate, and .94 for beef protein.

Nutritional Benefits From Choline

Newer research about beneficial vitamins, antioxidants and other important nutrients in eggs has further added to their appeal. One of

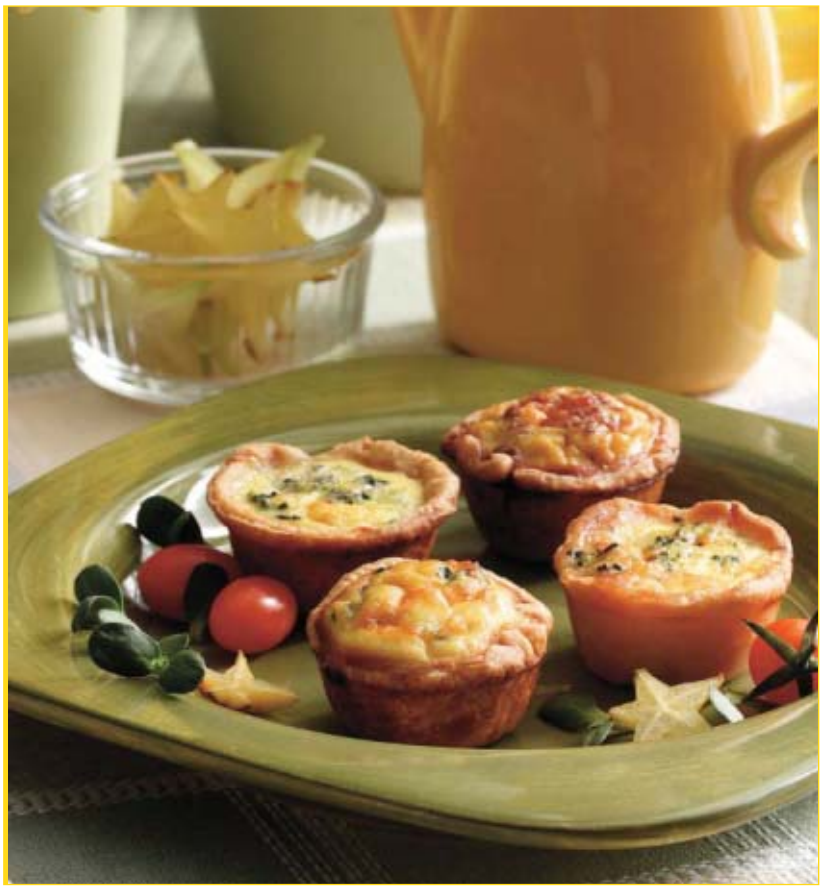
these nutrients is choline—an essential nutrient that provides a range of benefits in human nutrition.

While choline was discovered in 1862, its importance was not recognized until much later and Daily Reference Intakes (DRIs) for choline were not established until 1989. In 2001 the FDA allowed a nutrient content claim for choline. Foods that contain at least 110mg of choline per serving (or 20% of the Daily Value for choline based on 550mg reference) may be labeled as an "excellent source of choline" and foods containing at least 55mg of choline per serving may be labeled as a "good source of choline." A large egg contains approximately 180mg of choline.

The body produces choline, but research is showing that humans need more than the body can synthesize. As a result, a healthy diet needs to include choline, points out Dr. Donald McNamara, Executive Director, Egg Nutrition Center (ENC). The human body converts choline into acetylcholine, which plays a role in skeletal muscle movement, the regulation of smooth and cardiac muscle, and is believed to be involved in learning, memory and mood.

One area of research currently being explored is the role of choline in fetal development. Choline, like folate, has been shown to decrease the incidence of neural tube defects. A further benefit of an adequate choline intake during pregnancy is improved brain function. Animal studies (Albright, CD, et al. 1999. Brain Res Dev Brain Res, 115: 123-9 and Jones JP, et al. 1999. Brain Res Dev Brain Res, 118: 159-67) have shown positive changes in brain function and memory in offspring of female rodents whose diets were supplemented with choline in late pregnancy. These changes continued into adulthood.

"Adequate maternal choline stores are vital to a healthy pregnancy," stresses Jenny Heap, M.S., R.D., ENC. This is due to the high rate of choline transfer from mother to fetus. Human milk is also rich in choline, making it important for lactating mothers to consume the recommended amount of choline.



Due to hectic lifestyles, people are eating smaller and more portable mini-meals. These mini quiches fit into this trend.

Other research has revealed that choline plays key roles in proper nerve signaling, strengthening cell membranes, keeping homocysteine levels in check and preserving brain function in the elderly.

Protecting Vision

The antioxidants lutein and zeaxanthin, found in eggs, play an important role in preventing eye disease. The human eye contains macular pigment, which acts as a filter to protect the eye from photo damage, explains McNamara.

Ultraviolet and blue wavelengths can damage the rods and cones of the eye. The result is blind spots in the middle of a person's vision since this is the area where the eye focuses. The name of this condition is age-related macular degeneration (AMD). AMD is the number one cause of vision loss in older adults in the U.S.

Lutein and zeaxanthin are the only two caroteniods found in the human eye. Specifically, they are found in the macular region of the retina and absorb ultraviolet and blue wavelengths. As lutein and zeaxanthin are oxidized, they absorb ultraviolet waves and blue light. Once oxidized, these antioxidants need to be replaced. Lutein and zeaxanthin cannot be

This hardy fettuccini features noodles that include eggs as an ingredient.

synthesized by the body and, therefore, can only be obtained from dietary sources.

Green vegetables, such as spinach, kale and broccoli, are commonly recommended for promotion of eye health because of their high lutein content. However, research shows that the lutein and zeaxanthin in eggs may have a higher bioavailability because of the egg's lipid matrix. Chung and colleagues (Chung et al., 2004 J Nutr. p 1887-1893) showed that lutein from egg yolk is more effective in raising serum lutein levels than the same amount of lutein from spinach or vitamin supplements.

Lutein and zeaxanthin are also found in blood serum, adipose tissue, breast tissue and breast milk, in addition to the eye. They are considered important antioxidants in the protection of human skin from harmful effects of environmental exposure.

Minimal Impact

Some concern has been expressed about the cholesterol level in eggs; however, extensive research has shown that dietary cholesterol intake has little significant effect on a person's risk for coronary heart disease (CHD). As early as 1982, the Framingham Dietary Study refuted the assumption that egg consumption had a significant impact on blood cholesterol levels.

More recent studies by Greene (Greene CM, et al. 2005. J Nutr, p 2793-8 and Green CM, et al. 2006 Nutr and Metabolism, p 6) showed that healthy men over 60 years old and postmenopausal women who regularly included whole eggs in their diet did not increase their CHD risk profile. Yet according to a survey in Mintel's report, Eggs (published June 2006), 36% of participants aged 55 to 64 and 39% of participants over 65 years old agreed with the statement, "I eat fewer eggs than I like because of my concern about cholesterol." That was in comparison to 30% of all survey participants. The survey was conducted online, with 1,007 people aged 18 and older participating.

"Thanks to accelerating research in the area of genetics, we now understand that, in addition to age, gender, ethnicity, physical activity, and hormonal fluctuations, one's genetic make-up can strongly influence physiological responses to dietary intake," Heap wrote in the Spring 2006 edition of *Nutrition Close-Up* that included several articles on cholesterol studies.

In a Nov. 8, 2006, letter to the editor, nutritionist Dr. David Kritchevsky wrote in response to the Spring 2006 issue of *Nutrition Close-Up*: "Recognition of the importance of the presence of individual compounds such as choline, lutein, zeaxanthin, polyphenols, etc. have made foods, originally shunned because of their fat content, desirable. A life-long dietary pattern appears to be the major factor in the development of diet-related disease."

Role of Eggs in New Products

Nutrient-dense eggs are an ideal ingredient in an expansive array of foods products. Eggs are multifunctional—they are used as foaming agents, emulsifiers, binding agents and as colorants, points out Dr. Glenn Froning, Food Science and Technology Advisor for the American Egg Board and Professor Emeritus, University of Nebraska. One of the benefits of using eggs in these roles is they contribute to a clean label, he adds.

Eggs offer numerous advantages when used as an ingredient, as a result eggs are being incorporated into more new product formulations. According to the Mintel Global New Products Database (GNPD), 384 new foods and beverages in which "egg" or "eggs"

was used in the product description were introduced in 2006 compared to 303 in 2005, 391 in 2004, and 214 in 2003. In 2006, the bakery category saw the most new products with egg or eggs in the product description at 118 products, followed by "meals & meal centers" at 97 new products.

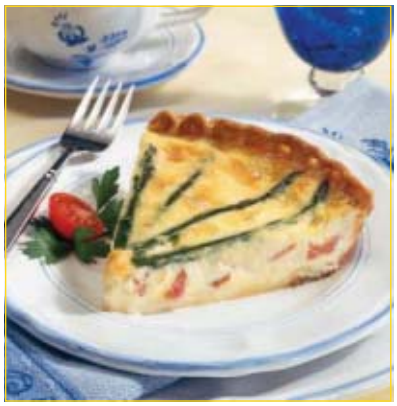
Gluten-Free Products

Eggs can be used as an ingredient in gluten-free foods. People who have celiac disease, a genetic disorder that affects approximately 1.5 to 3 million Americans, are advised to maintain a life-long diet free of gluten. There is no known cure for celiac disease, which causes chronic inflammation of the small intestine

On January 23, 2007, the FDA published a proposed rule defining "gluten free" under the Food Allergen Labeling and Consumer Protection Act (FALCPA). Gluten would be defined as proteins that naturally occur in a prohibited grain and that may cause adverse health effects in persons with celiac disease. Prohibited grains would be defined as wheat, rye and barley, and crossbred hybrids of the three grains. It would not include other grains, which could be marketed as "gluten free" if the finished product contains less than 20ppm gluten.

Eggs can provide a number of functions in gluten-free products and can be used as a binder instead of gluten-rich ingredients in formulations such as crab cakes and meatballs. In 2005, SPINSscan Natural and Conventional channels (Schaumburg, Ill.) reported that there were over 3,150 products with gluten-free label claims on the market, totaling over $696 million in sales.

Two recently introduced products that are promoted as gluten-free are Kineret Macaroni & Cheese and Canton Dijonnaise Fondue and Dipping Sauce. Marketed in Canada by Lassonde Specialties Inc. (Saint-Damase, Quebec, Canada), Canton Dijonnaise Fondue and Dipping Sauce contains no preservatives and is gluten-free. The formulation for this sauce contains egg yolk.



Left:** **Eggs can be featured in a wide variety of breakfast foods, including in the elegant asparagus quiche pictured here.

Right:** **Eggs provide an important role in this ham & cheese braid that includes the appeal of vegetables.

In the U.S., Kineret Macaroni & Cheese, from KFP International Ltd. (Bayonne, N.J.), is made with real cheddar cheese. The product is microwaveable, gluten-free and Kosher certified. The noodles contain egg whites. The egg in the formula helps create a noodle that uses no flour, explains Martin Davidson, Director of Communications for KFP.

Kineret Macaroni & Cheese was introduced in March 2006 in time for Passover. The response was very positive, notes Davidson. "The product tastes very much like regular macaroni and cheese. The noodles taste very much like wheat noodles. Many people were very surprised that it is gluten-free and Kosher for Passover," he adds.

New Product With Eggs

(Number of New Packaged Retail Foods with "Egg" or "Eggs" in their Description)

Category	2006	2007 est.*
Bakery	118	98
Confectionery	40	144
Desserts & Ice Cream	19	8
Meals & Meal Centers	97	148
Processed Fish, Meat & Egg Products	43	28
Sauces & Seasonings	30	8
Side Dishes	22	28
Soup	7	20
Spreads	8	12
Total	384	494

Source: Mintel Global New Products Database (GNPD)
*2007 numbers are estimated

Left: ***The whole eggs in Pepperidge Farm's Tahiti Coconut Cookies provide wholesomeness, add flavor, and increase the brown baked notes. In addition, the protein in the whole egg contributes to the structure of the cookie.***

Right: ***Consumer desire for convenient foods that fit into their busy lifestyles has made convenience breakfast foods a "hot" category. Shown here are Aunt Jemima Sausage, Egg and Cheese Croissant Sandwiches***

Indulgent products

Consumers who want to reward themselves often do so with a culinary treat. In an article on food consumption through 2020, Noel Bliscard, et al., U.S. Department of Agricultural (USDA) Economic Research Services (Food Review, Spring 2002), noted that as the U.S. population continues to become wealthier, older, more educated and more ethnically diverse, they will spend extra discretionary income on quality and convenience, rather than quantity. This will create an even larger demand for convenient, indulgent foods.

Eggs provide important textural characteristics in indulgent products such as sauces, dressings, ice cream, cakes and other products. Pepperidge Farm (Norwalk, Conn.) reintroduced Tahiti Coconut Cookies from its archive into the Distinctive Cookie line in January 2007. The fresh whole eggs in the cookies provide wholesomeness, add flavor, increase the brown baked notes, and the protein in the whole egg contributes to the structure of the cookie, explains Geri Allen, Manager Brand & Corporate Communications, Pepperidge Farm. She adds that overall performance on Tahiti has been strong and feedback from the field has been positive.

Another indulgent product that incorporates eggs is Häagen-Dazs® Light Chocolate Fudge Brownie Ice Cream from Dreyer's Grand Ice Cream Inc. (Oakland, Calif.). It is an all-natural, super-premium light ice cream that the company says has 50% less fat and 16% fewer calories, but with all the taste. The ingredient statement for this products is: Skim milk, corn syrup solids, cream, fudge brownie pieces (sugar, water, wheat flour, natural cocoa powder, butter (cream, salt), eggs, salt, vanilla, baking soda), sugar, cocoa processed with alkali, egg yolks.

Sports Products

The importance of protein for athletics is an active area of research. Melvin H. Williams, Ph.D., Director; Human Performance Laboratory, Old Dominion University (Norfolk, Va.), recommends that for strength-trained athletes attempting to increase muscle mass, "probably the most important nutritional considerations are to obtain sufficient energy and protein." He adds that, "Adequate amounts of both may be obtained simply by increasing the amount of complex carbohydrates and healthful protein sources in the daily diet." (See Gatorade Sports Science Library at www.gssiweb.com/Article_Detail.aspx?articleid=20&level=6&topic=2.)

Amino acids, peptides and proteins have been shown to assist with muscle growth and also repair post-exercise damage. One of the most cost-effective sources of protein is eggs, says Jennifer Cooper, President, Lead Point Solutions—an Orem, Utah-based company that provides product development, market research and regulatory assistance for health and functional foods. As the popularity of protein bars and other high protein foods for athletics increases, eggs (whole, white and yolks in powdered and other forms) can provide high-quality protein for these products.

MET-Rx U.S.A. Inc. (Boca Raton, Fla.) offers Big 100 meal replacement bars. These bars contain a protein blend that includes dried egg white. They are sold under the company's "muscle and strength" category. A 3.52 oz (100g) bar contains 27g of protein.

Convenience Breakfast Foods

Eggs have long been a popular choice for breakfast. Now there is even more reason to eat them since new research is showing added benefits of eating them in the morning. A study by Vander Wal and colleagues (Vander Wal, JS, et al. 2005. JACN, p 510-515) shows that an egg breakfast increases satiety and helps reduce caloric intake the rest of the day.

In the study, 28 overweight women between the ages of 18 and 60 had either two scrambled eggs, two pieces of toast, and one tablespoon of reduced-calorie fruit spread or a bagel, two tablespoons of cream cheese, and three ounces of non-fat

yogurt for breakfast. The women who consumed the egg breakfast consumed fewer calories at lunch and fewer calories throughout the day. The authors concluded that the egg breakfast was more effective than the bagel breakfast in sustaining satiety.

A follow up study examined the effect of an egg breakfast on weight loss. Nikhil Vinod Dhurandhar, of the Biomedical Research Center at the Louisiana State University System, found that eating egg breakfast while on a weight loss diet enhances weight loss, presumably by increasing adherence due to greater satiety.

Speaking at the Experimental Biology Annual Meeting, April 28 – May 2, 2007 in Washington, D.C., Dhurandhar explained that 160 overweight or obese subjects were assigned to egg, egg-diet, bagel, or bagel-diet groups. After eight weeks, the egg-diet group had 65% greater weight loss versus the bagel-diet group. The egg-diet group also reported feeling more energetic than the bagel-diet group. Changes in plasma total- , HDL- and LDL-cholesterol, and triglycerides did not differ significantly between groups.

Despite the importance of breakfast, only 38% of Americans view their breakfast as a complete meal, according to a recently released study on what Americans eat in the morning by The NPD Group Inc. (Port Washington, N.Y.). The report notes that due to hectic lifestyles, people are eating smaller and more portable mini-meals. When people prepare or cook something in the morning, it typically takes under 10 minutes to prepare, and more than half of all breakfast meals are consumed in 10 minutes or less.

Consumer desire for convenient foods that fit into their busy lifestyles has made convenience breakfast foods a "hot" category. One example, Aunt Jemima Sausage, Egg and Cheese Croissant Sandwiches, was introduced in 2005 by Pinnacle Foods Group Inc. (Mountain Lakes, N.J.). Other breakfast sandwiches from the company are: Sausage, Egg and Cheese Biscuit Sandwiches; Sausage, Egg and Cheese French Toast Sandwiches; Sausage, Egg and Cheese Griddlecake Sandwiches; and Ham, Egg and Cheese Griddlecake Sandwiches.

Left: ***Egg products are a good choice for breakfast since studies have shown that eggs increases satiety and helps reduce caloric intake during the day.***

Right: ***In 2006, the bakery category saw the most new products with egg or eggs in the product description, according to the Mintel Global New Products Database. Within the bakery category, date nut bars include eggs into the formulation.***

"Eggs are an important part of any breakfast sandwich," notes Jeff Maloy, Brand manager for Pinnacle Foods. "Their savory taste is a perfect complement to the buttery croissant, sausage and cheese in Aunt Jemima's Croissant Sandwich. In addition, eggs provide protein to start the day," he adds.

Consumer acceptance has been strong. The Croissant Sandwich is one of Aunt Jemima's most popular items. "Given the increasing need for on-the-go breakfast solutions, we expect breakfast sandwiches to continue to grow," explains Maloy.

Another convenient breakfast introduced in 2006 was Jimmy Dean Canadian Bacon & Cheese Whole Grain Muffin Sandwich from Sara Lee Food & Beverage (Downers Grove, Ill.). The company promotes the product as low in cholesterol and a good source of protein. There are nine muffins per package, each containing 4.5g of fat, 0g of trans fat and 5g of whole grains. More recently in 2007, Jimmy Dean announced the launch of Jimmy Dean Breakfast Bowls. Two of them feature eggs: Sausage Breakfast Bowls contain real scrambled eggs, diced russet potatoes, Jimmy Dean sausage and cheddar cheese; and Bacon Breakfast Bowls have bacon instead of the sausage. Each of the breakfast bowls comes in a microwave-ready container that can be prepared in less than three minutes.

"Our Jimmy Dean Breakfast Bowls have everything that you love for breakfast in a quick and convenient package, without any mess or dirty dishes," said Jim Ruehlmann, Vice President of Jimmy Dean, when the product was introduced.

Eggs as ingredients are available in a wide variety of forms, including dried, frozen and refrigerated for a host of applications. They are a nutrient-dense ingredient that contributes to a clean label. pf

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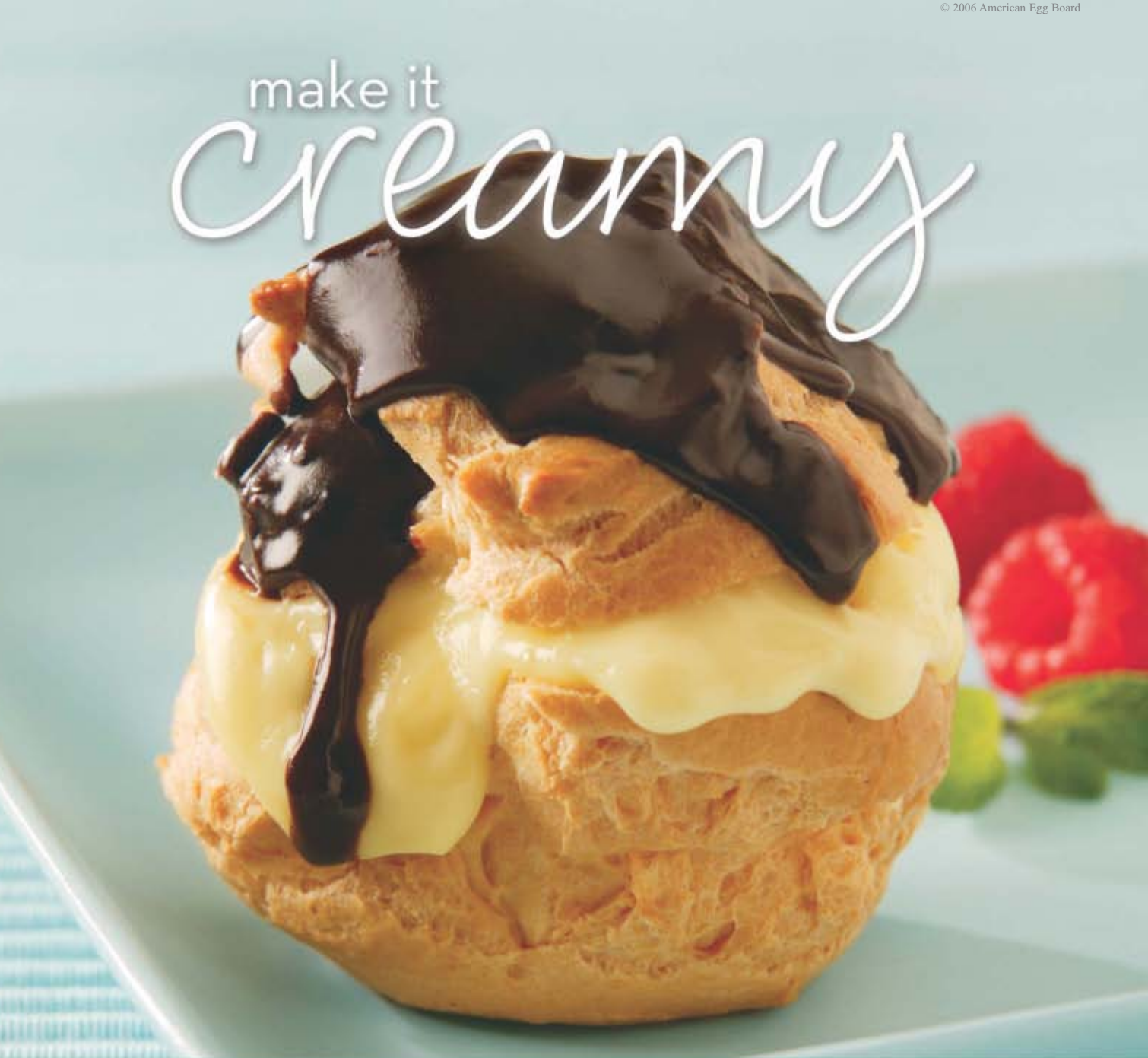

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